3.0 AFFECTED ENVIRONMENT

This chapter describes the current condition, location, and use of the resources on public lands in the Clear Creek Management Area (CCMA) administered by the Bureau of Land Management (BLM) Hollister Field Office (HFO) that could be affected by the range of alternatives described in Chapter 2 of this RMP/EIS. The affected environment descriptions focus on those aspects of the physical, biological, cultural, social, and economic conditions that could be affected by the management actions prescribed in the range of alternatives.

Chapter 3 provides a general discussion of the Planning Area and then focuses in on those specific lands within the CCMA that are administered by the BLM (refer to Map 1 in Appendix I). For clarification:

- The Planning Area includes all lands within the boundaries of the within the Clear Creek Management Area (CCMA), including privately owned lands and State and Federal lands, including those administered by the BLM HFO.
- The Planning Area is divided into five management zones with various combinations of management actions and different land use allocations under the range of alternatives. However, this chapter describes the current resource uses and conditions in CCMA in general. Where possible, resources issues and concerns specific to any of the five management zones are also discussed.
- "BLM-administered lands," or "BLM public lands" are those specific areas within the Planning Area for which BLM has jurisdiction to make land use decisions. The term "Decision Area" may be used to describe these lands throughout this RMP/EIS.

3.1 Recreation

3.1.1 Introduction

This section addresses the recreational opportunities and trends in the Planning Area, including off-highway vehicle (OHV) recreation and non-motorized recreation. For further discussion of transportation and travel management, refer to Section 3.3, "Travel and Transportation Management."

BLM administered lands in the CCMA support a variety of recreational opportunities, including hiking, hunting, hobby gem and mineral collections (commonly referred to as 'rockhounding'), and hundreds of miles of OHV use trails. Over the past 20 years, motorized vehicle use has been more closely managed as a result of increasing demand, the listing of threatened and endangered species, and public health and safety hazards associated with abandoned mine lands. Permanent and temporary closures have also increased awareness of environmental issues and public interest and involvement in management of recreation resources on public lands.

3.1.2 Regulatory Framework

The primary framework for managing recreation is BLM Manual 8300, Recreation Management (BLM 1990). The objectives of the BLM's outdoor recreation program are to: (1) provide a broad spectrum of resource-dependent recreational opportunities to meet the needs and demands of visitors to public lands; (2) foster agency-wide efforts to improve service to the visiting public; (3) maintain high-quality recreation facilities to meet public needs and enhance the image of the agency; and (4) improve public understanding and support of the BLM by effectively communicating the agency's multiple-use management programs to the recreation visitor.

Vehicle use in the Planning Area is managed under the direction and authority in 43 CFR Part 8340 "Off-Road Vehicles," and Subpart 8342, "Designation of Roads and Trails." The off-highway vehicle (OHV) regulations apply to use of routes by the general public. Certain other routes may be open to private landholders, and grazing or other permittees, to meet specific access needs and/or legal rights.

3.1.3 Regional Setting

The Planning Area hosts unique resources and recreation opportunities for thousands of visitors that are attracted to the Southern Diablo Range in Central California, annually. These resources provide natural beauty, solitude, and freedom from the structure and regulations of urban areas. In all recreational opportunities, scenic values are often cited as an important resource to the participant's recreation experience. Virtually all recreation activities are dependent upon availability of access within the planning area, which BLM can acquire through purchase of lands or public easements from willing sellers.

In general, public recreation use of BLM administered lands is unsupervised and unorganized. Clear Creek Management Area is classified as a Special Recreation Management Area (SRMA) by BLM because of the resources monitoring, law enforcement patrol, and investment in facilities needed in order to manage OHV use and recreation on these public lands.

Additional OHV recreation opportunities in the region, are provided in the Hollister Hills State Vehicular Recreation Area (SVRA); Oceano Dunes SVRA, Metcalf County Park, Frank Raines County Park, and BLM's Jawbone Area of Critical Environmental Concern. More information on these areas is presented in Chapter 4 (Environmental Consequences), under Recreation (Section 4.1). Additional non-motorized recreation opportunities in the region, are provided in the Los Padres National Forest and Pinnacles National Monument; Fort Hunter Liggett; Henry Coe State Park; Coalinga Mineral Springs County Park

and BLM public lands; San Antonio, Pine Flat, and San Luis Reservoirs; East Bay Regional Parks; and numerous other Federal, State, regional, local, and private facilities.

3.1.4 Current Conditions and Trends

3.1.4.1 OHV Use and Other Recreation Opportunities

Off-Highway Vehicle Use

Motorcycle and ATV riding are the most prevalent recreation activities in the CCMA, with almost all of the use occurring on more than two-hundred miles of designated routes within the 30,000-acre Serpentine ACEC. The majority of the use occurs within the lower six miles of Clear Creek Canyon., and while motorcycle and ATV riding are the most common OHV recreation activities, four-wheeled drive vehicles and ATVs are also used for access to a variety of other recreational activities in CCMA, including hunting, rockhounding, and hiking.

Since the 1970's, several large organized OHV events have been conducted annually in the CCMA. These include, the Quicksilver Enduro sponsored by the Salinas Ramblers Motorcycle Club (SRMC), and the Wild Boar sponsored by the Timekeepers Motorcycle Club. Other organized OHV events held regularly in CCMA include the SRMC's Picacho Hare Scrambles, the Molina Ghost Run four-wheel drive tour sponsored by California 4-Wheel Drive Association, and the Family Fun Ride sponsored by the Racers Under The Son.

A combination of regulatory signs, route number signs, directional signs, and fencing is used to direct visitors along the trails identified on the user map. BLM park rangers and law enforcement patrol the CCMA, providing visitor assistance and information, and enforcing Federal and State rules and regulations, as appropriate.

There are approximately 5,900 acres of barren areas scattered throughout the CCMA. The 2006 CCMA Amendment for designated 478 acres of BLM barrens available for OHV use that are identified on the CCMA user map. The barrens are used primarily by ATVs and motorcycles as "open play areas" with challenging hill climbs, while some of the more gradually sloped barrens are also used by full-sized 4-wheel drive vehicles and for enjoyment by riders of all skill levels. The barrens designated for OHV use are adjacent to major routes or are located along routes that traverse barren complexes to make them accessible to the various user groups.

Other Recreation Opportunities

Other recreational opportunities include hobby gem/mineral collecting, hunting, hiking/backpacking, and sightseeing. Hobby gem and mineral collectors are drawn to the Clear Creek area by the presence of over 100 semi-precious minerals and gemstones. This is one of the most highly mineralized areas in California. Collectable minerals include jadeite, cinnabar, andradite, tremolite, melanite, topazolite, barkevikite, clinochlore, vesuvianite, artinite, natrolite, neptunite, and benitoite. Some minerals such as benitoite are extremely rare and the CCMA is practically the only place in the world where they can be found. Highly mineralized areas generally occur along faults and inclusions/intrusions in and around the serpentine body. Hobby gem/mineral collecting (or rockhounding as it is commonly called) accounts for about five percent of the total recreation use in the CCMA.

Several commercial gem collectors also maintain mining claims and work infrequently in the area. The only known commercial deposit of benitoite is found on a patented mining claim (private land) in the

CCMA. The area's unique geology also attracts geology students and researchers from local and national universities including Stanford and Harvard.

Hunting activities occur primarily on the outskirts of the ACEC boundary, although, access to public lands has traditionally been from Clear Creek Canyon to the remote regions of CCMA to the east and south of the ACEC. The primary game animals sought are wild boar and deer. Deer season occurs during the months of August and September with boar season occurring throughout the year. Hunting for mule deer at CCMA is concentrated in the Clear Creek, Spanish Lake, Condon Peak (Condon Zone), and Joaquin Ridge (Cantua Zone) regions. Hunting can be poor in drought years, resulting in far fewer deer than hunters, especially in the first week of the season. Deer hunting in past years has been accompanied by increased garbage and vandalism at CCMA during years when deer numbers are depressed.

Hiking and sightseeing occurs throughout the year. Visitors are drawn to the area to see the unique ecosystems and experience the rugged terrain present on the CCMA. Sport utility vehicles are used by weekend sightseers to traverse the more commonly used routes. These routes provide views of the unique habitats and geological formations found within the CCMA, and views of the Central Valley and the Sierra Nevada.

Though not as common as other recreation activities, CCMA public lands have been used as a launching place for hang gliders at Goat Mountain, which provides a unique launch site as a peak that is accessible by full size vehicle with a glide path to Coalinga.

3.1.4.2 CCMA Visitor Use

Clear Creek was among the top five most popular areas cited by California off-highway-vehicle (OHV) users in a 1990 study conducted by the California Department of Parks and Recreation (CDPR, 1990). The CCMA continues to be popular with motorcyclists who use the area for hill climbing, trail riding, and camping. Other common activities include 4-wheel drive off-highway vehicle touring, hobby gem/mineral collecting, hunting, hiking/backpacking, and sightseeing.

Most motorcycle users are from the San Jose/San Francisco metropolitan areas with normal travel time of approximately three hours to get to the CCMA. These users travel very close to the 6,800-acre Hollister Hills State Vehicle Recreation Area (SVRA) en route to Clear Creek. This intensively managed OHV use area is one and one-half hours closer, but the unique challenge of the serpentine soils and the amount of area available for OHV recreation use continue to draw motorcycle riders to Clear Creek. Because of the distance to other urban areas in the region, including Fresno, Visalia, Salinas, Santa Cruz, and San Luis Obispo, visits to the CCMA require considerable highway driving.

In 1984, approximately half of the total number of visits to the CCMA was attributed to the use of OHVs and one-third was attributed to hunting. Visitor use now (and then) continues to be most prevalent during the winter months (November – April), because winter rainfall keeps the dust levels lower and temperatures cooler, as opposed to the extreme heat and dust present during the dry summer months. Prior to 2005, public access into CCMA was authorized year-round, and recreation use declined by nearly 80 percent during the summer months, although visitor use would increase significantly with the onset of deer season from August through mid-September.

Beginning in the summer of 2005, the BLM instituted Dry Season Use Restrictions based on air sample results detailed in a Technical Memorandum from the EPA titled "Human Health Risk Assessment - Asbestos Air Sampling Clear Creek Management Area, California" that was published on September 15th, 2004. The BLM's 2006 Record of Decision (ROD) for the CCMA RMP Amendment and Route Designation formally adopted the Dry Season Use Restrictions, which limits vehicle use to approximately 35 miles of major routes in the Serpentine ACEC from June 1st through October 15th.

Visitor use data prior to 2005 is based on primitive infrared counters at the two main CCMA entrances, from Coalinga Road and New Idria. These estimates were unable to account for access from adjacent private property, and the counters were subject to vandalism and mechanical failures. When a counter had a period of inoperability, visitor use trends were extrapolated from data immediately prior, or estimated based on trends during the same period from the prior year. The program was updated to a modern and accurate traffic counting system in 2005.

January 2006 marked the signing of the ROD for the CCMA RMP Amendment and Route Designation. As displayed in Table 3.1-1, visitor use appears to have declined as a result of areas being closed to OHV use and changes to the recreation experience in CCMA from 2005 – 2008. .However, the advent of precise traffic counters and record high fuel prices during this period also likely contributed to the decline in visitor use in CCMA.

Fiscal Year 2008 further marked the implementation of a Fee Program. These fees, in conjunction with high fuel costs and the strictly enforced route designations were likely factors influencing visitor use decline when compared to previous years. Also, BLM's temporary closure of the Serpentine ACEC to all forms of public entry in response to the EPA's CCMA Asbestos Exposure and Human Health Risk Assessment released on May 1, 2008 significantly reduced the total number of visitor use days for 2008.

In 2007/2008, recreation use in the Planning Area was estimated at 35,000 visitor days, with about 80% of this attributed to OHVs. These estimates have not changed drastically over the years, even with the increasing popularity of OHV recreation in California.

BLM staff and law enforcement personnel access public lands for administrative purposes on a regular basis. Typically, BLM law enforcement personnel patrol areas with high visitor use by vehicle, while BLM resource staff and specialists make regular visits by vehicle and on foot to various locations to meet annual monitoring requirements and/or review proposed projects or activities on BLM public lands.

Table 3.8-1. CCMA Visitor Use

Year	Visitors
2003	50,000 (Estimated)
2004	50,000 (Estimated)
2005	43,235
2006	43,187
2007	35,267
2008	28,428

3.1.4.3 Recreation Trends and Forecast

According to the California State Parks report "Taking the High Road" (2002), off-highway motor vehicle recreation demand has increased dramatically in the last two decades. The study found that California has the highest population in the nation (34 million) and the highest number of OHV

enthusiasts (3.5 million, or 14.2 percent of all California households); and San Benito County saw a population increase of 45 percent and a 113 percent increase in OHV registrations during the 1990's. Increases in OHV registrations by vehicle type statewide during that time were: dirt bikes 30 percent (from 153,304 to 199,142), all-terrain vehicles 96 percent (from 91,984 to 180,273), and dune buggies and sand rails 96 percent (from 17,500 to 34,243), and street licensed 4-wheel drive vehicle registrations increased 74 percent (from 290,651 to 506,585). During this same period OHV land availability decreased 48 percent (from 13.5 million to 7.0 million acres). Nonetheless, California State Parks still reports there are approximately 100,000 miles of routes and trails are available for OHV use throughout California. Of these 100,000 miles, 10,000 miles (10 percent) represent single-track trails and 16,000 miles (16 percent) represent trails of interest to 4-wheel drive enthusiasts. The remaining 74,000 (74 percent) miles are connector routes for those pursuing a variety of forms of recreation.

The number of annual recreational visits to CCMA public lands continues to increase, primarily because of their proximity to urban areas such as San Jose, San Francisco, and coastal communities, and because of increasing population growth in the Central Valley and southern California. In the 1980's, California State Parks prepared a Feasibility Study and Draft Environmental Impact Report (EIR) for a proposed State Vehicular Recreation Area (SVRA) on private lands adjacent to CCMA, known as the Martin Ranch, and BLM-administered lands in the Cantua Zone. This area was identified as suitable to consider for off-highway vehicle recreation because of the proximity to major urban centers. Therefore, this RMP/EIS also considers emphasizing off-highway vehicle recreation on BLM public lands in the Cantua Zone, and incorporates information from the California State Parks Martin Ranch SVRA Feasibility Study (1984) and Draft EIR (1985) into the analysis of environmental impacts under Alternative D.

Off-highway vehicle (OHV) use is becoming more popular throughout the country, particularly in California. This trend can be seen through the increase of sales in ATV's, motorcycles, and four-wheel drive vehicles. Political and financial pressures are restricting OHV use and eliminating OHV use from historically available areas. The displaced users are seeking OHV opportunities in other areas. Recreation areas that provide OHV access, like Clear Creek Management Area, will most likely become more congested. This will continue to be a challenge for BLM as budgets continue to be limited. Congressional designations and lawsuits that restrict types of use will cause conflict and impacted groups/individuals will become more vocal.

Hobby gem and minerals collection (rock-hounding) and hunting would also continue to be popular activities in CCMA. Both would probably be subject to more restrictions due to human health risks from exposure to asbestos in CCMA. Areas outside the Serpentine ACEC will likely become more popular as BLM implements public health and safety measures. Volunteers could play a greater role in the development and maintenance of these areas.

Recreational use of public lands can be expected to increase as population grows, not only in the Central Coast and Diablo Range areas that support local use but also throughout the HFO and California. If recreation use were to grow at a rate proportional to projected population growth in the Central Coast and Diablo Range areas, over 50,000 annual visits would be expected, compared to the 43,000 visitor use days recorded in 2006.

Development of trails as well as installation of any other visitor facilities may become necessary to manage public use and meet recreation opportunity demands in the CCMA's San Benito Mountain Research Natural Area. Such infrastructure would require greater law enforcement presence, as well as increased demand for non-motorized trail use and improved facilities outside the Serpentine ACEC.

3.1.4.4 Recreation Facilities, Fees, and Permits

Facilities, Outdoor Kiosks, and Displays

Visitor facilities are limited to Oak Flat Campground, Jade Mill Area, and five staging areas that have trash receptacles and pit toilets. Bulletin boards with general information and regulatory information are present at these areas, the Condon Peak trailhead, and at the main entrances to the CCMA. Posted information details upcoming events, campfire requirements, asbestos warnings, and user maps showing routes and other geographic points of interest.

Recreation Fees

It is BLM's policy to collect fees at all specialized recreation sites, or where the BLM provides facilities, equipment or services, at federal expense, in connection with outdoor recreation use. Fees on public lands managed by BLM are established in accordance with the Federal Lands Recreation Enhancement Act (2005). To meet increasing demands for service and maintenance, the HFO established a fee collection program for the Clear Creek Management Area, beginning in January 2008, as described in the Federal Register (Vol. 72, No. 123).

The CCMA qualifies as an area where fees can be charged based on the significant opportunities for outdoor recreation, substantial Federal investment, the ability to collect fees efficiently, developed parking, permanent toilets, permanent trash receptacles, interpretive signs, picnic tables, and security. The fee is intended to provide funding to maintain existing facilities and recreational opportunities, to provide for law enforcement presence, to develop additional services, and to protect unique and sensitive resources in the area.

The rationale for charging recreation fees was established in the Clear Creek Special Recreation Management Area Business Plan and in a manner consistent with the following criteria: (1) The amount of the recreation fee shall be commensurate with the benefits and services provided to the visitor; (2) The aggregate effect of recreation fees on recreation users and recreation service providers were considered; (3) Comparable fees charged elsewhere and by other public agencies and by nearby private sector operators were considered; (4) Public policy or management objectives served by the recreation fee were considered; (5) Recommendations and guidelines regarding initiating fee sites from the Central California Resource Advisory Council (RAC) was considered and incorporated into the Business Plan; and (6) Other factors or criteria as determined by the Secretary were considered.

As the population of California continues to increase, the public's demand for open space and recreational opportunities is expected to increase as well. Other Federally managed recreation areas annually increase their use fees, which in turn continue to displace and encourage outdoor recreational users to seek lower fees, such as BLM public lands in CCMA.

Special Recreation Permits

The HFO issues an assortment of special recreation permits for a range of activities, including commercial use, competitive use, vending, filming, special area use, and organized group activities and event use. Special recreation permits are required for specific recreational uses of the public lands and related waters. They are issued as a means to manage visitor use, protect natural and cultural resources, and provide a mechanism to accommodate commercial recreational use.

The HFO has regularly issued recreation permits for three annual competitive motorcycle enduro races in CCMA, two annual non-competitive events, and several other miscellaneous permits such as organized field trips in the San Benito Mountain RNA.

3.2 Hazardous Materials and Public Health & Safety

3.2.1 Introduction

As managers of the nation's public lands, the BLM is responsible for the health and safety of visitors to public lands. The HFO engages in hazardous material emergency response actions, hazardous waste site evaluations, and prioritization of site remediation activities in accordance with Federal, State, and local laws and regulations. Remediation is typically done in coordination with the U.S. Environmental Protection Agency, California environmental regulatory agencies such as the Department of Toxic Substances Control and the Regional Water Quality Control Boards, counties, and potentially responsible parties (both public and private). This section addresses hazardous materials management on BLM public lands in CCMA, as well as associated risks to the public health and safety.

Historically, public lands located within the CCMA were used for mining of mercury and asbestos, locating communication sites on mountain tops, and other resource uses like timber harvesting. More recently, CCMA public lands have been subject to numerous unauthorized and illegal activities, such as dumping of household and toxic wastes and marijuana cultivation.

Due to environmental and human health risks concerns associated with the presence of asbestos in the bedrock and soils of the New Idria Formation, approximately 30,000 acres of BLM-managed lands were designated as the Clear Creek Serpentine Area of Critical Environmental Concern (ACEC) under the Record of Decision for the original Hollister RMP (1984). Refer to Section 3.10, for more information on the Serpentine ACEC designation. Use of these lands, both legally and illegally, has resulted in the release of hazardous substances and the creation of hazardous waste sites.

Located within the Serpentine ACEC, is the Atlas Asbestos Mine Superfund Site, which added to the National Priorities List in 1983. As EPA was finalizing its approach to the cleanup of the Atlas site in 1991, they identified the need to evaluate BLM's management of CCMA and evaluate the overall protection of human health and the environment. As a result, BLM developed a health risk assessment in 1992 to further determine what management actions were necessary to limit public risk to asbestos and incorporated the results into the 1995 CCMA RMP Amendment, and it's associated Record of Decision (1999).

3.2.2 Regulatory Framework

The principal Federal regulatory agency for setting laws and guidelines for hazardous materials is the U.S. Environmental Protection Agency (EPA). Key Federal laws and regulations pertaining to hazardous materials associated with the Planning Area include the:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Establishes prohibitions and requirements concerning closed and abandoned hazardous waste sites; provides for liability of persons responsible for releases of hazardous waste at these sites; establishes a trust fund to provide for cleanup when no responsible party can be identified; and
- Superfund Amendments and Reauthorization Act (SARA): Amendment to CERCLA (above) that establishes a nationwide emergency planning and response program and reporting requirements for facilities that store, handle, or produce significant quantities of hazardous materials; identified requirements for planning, reporting, and notification concerning hazardous materials.

3.2.3 Regional Setting

Historically, the region was known as the New Idria Mining district. The New Idria Quicksilver Mining Company began mining cinnabar and mercury from the region in 1854. Other materials such as asbestos, magnesite, nickel, and chromium were also extracted (USDI 2005). Mining of asbestos began in the 1950's and the last active asbestos mine in the U.S. was the KCAC asbestos mine.

In general, the region was an active mining and ore processing area for over a century. Many of the abandoned mercury mines were left to erode and degrade surface waters. BLM started an active Abandoned Mine Land program in the late 1990's. A summary of BLM's efforts to restore water quality by restoration of abandoned mercury mines is included in Section 3.2.3.3. In 2004, the Regional Water Quality Control Board issued a Total Maximum Daily Load (TMDL) for mercury in the CCMA.

3.2.4 Current Conditions and Trends

Within the Planning Area, the hazardous materials of most concern are primarily a result of a numerous historic mine sites and their associated retort piles that contain tailings of mercury and asbestos, in addition to many other heavy metals, such as nickel and cadmium. CCMA public lands are also subject to illegal dumping of hazardous materials such as used tires and autos, household waste, and industrial wastes, as well as waste from illicit drug operations. There are no specific target ranges; however target shooting does occur regularly in CCMA and on adjacent private lands at Mexican Flats. Occasionally, target shooting that involves the use of "e-waste" such as old computers or televisions occurs in scattered remote locations.

3.2.4.1 Naturally Occurring Asbestos

In the mid-1950's, an investigation by the California Division of Mines and Geology indicated that the serpentine matrix of the New Idria Formation was mainly chrysotile asbestos. 'Asbestos' is the name given to a number of naturally occurring, fibrous silicate minerals mined for their useful properties such a thermal insulation, chemical and thermal stability, and high tensile strength.

The New Idria Formation covers approximately 30,000 acres and was designated as the Serpentine Area of Critical Environmental Concern (ACEC) in 1984 based on the health concerns associated with exposure to naturally occurring asbestos, and because of the unique vegetation and forest types associated with serpentine formation. This area is also referred to as the Hazardous Asbestos Area (HAA).

Asbestos is a known human carcinogen and exposure to airborne asbestos poses a health and safety risk because persons breathing the air may breathe in asbestos fibers. Continued exposure can increase the amount of fibers that remain in the lung. Fibers embedded in lung tissue over time may cause serious lung diseases including: asbestosis, lung cancer, and mesothelioma. The boundaries of the ACEC were defined by mapping of serpentine soils derived from the New Idria Formation.

In 1962, the Atlas Division of the Atlas Corporation began construction of an asbestos mine and mill within the boundaries of the CCMA that was in operation until 1979. The mining activity included digging the asbestos ore out of surface pits and then milling the ore. The by-products (tailings) of the milling process were bulldozed into piles near the asbestos mill. The resulting fluvial and airborne asbestos emissions from the site lead the Atlas Mine to be approved for listing on the Environmental Protection Agency's (EPA) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund") program National Priorities List (NPL) in 1984. The NPL is the EPA's list of the hazardous waste sites potentially posing the greatest long-term threat to health and the environment.

In 1991, U.S. EPA signed the Record of Decision (ROD) selecting the cleanup remedy for the Atlas Asbestos Mine Superfund site in San Benito and Fresno counties, California. In the ROD, EPA noted that it was not proposing any action for the Clear Creek Management Area (CCMA), one of the Atlas site's four geographic areas. Instead, EPA stated that it would evaluate whether the United States Department of Interior Bureau of Land Management's (BLM) plans for management of CCMA were adequate to protect public health from exposure to asbestos found in the area.

Air sampling investigations conducted by EPA to address asbestos air pollution transport indicated that asbestos concentrations were similar within the North Central Coast air basin and San Joaquin Valley air basin. However, the localized on-site generation and inhalation of airborne asbestos was determined by both EPA and BLM to be a potential problem from motorized vehicle use in the CCMA.

In 2004, as part of the process of evaluating the Atlas Mine cleanup for possible delisting of the site from the federal Superfund list, EPA Region 9 initiated an asbestos exposure and human health risk assessment for the CCMA. The goal of the assessment was to use current asbestos sampling and analytical techniques to update a 1992 BLM Human Health Risk Assessment and provide more robust information to BLM on the asbestos exposures from typical CCMA recreational activities and the potential cancer risks associated with those exposures.

In order to assess the risk of exposure to asbestos in CCMA, Region 9 collected air samples while EPA employees and contractors participated in typical recreational activities at the Clear Creek Management Area. The samples were collected from the breathing zone of individuals riding motorcycles and all-terrain vehicles (ATV), driving and riding in sports utility vehicles (SUV), hiking, camping, sleeping in a tent, fence building, and washing and vacuuming vehicles after use at CCMA. Air filter sample cassettes were placed on adult samplers to collect air samples representing the breathing zone heights of both adults and children and samples were collected for both lead and trailing riders. These activity-based air samples were then analyzed for asbestos.

The activity-based sampling showed that activities which disturbed the soil recorded significantly elevated asbestos levels in the breathing zone. Motorcycle riding, ATV riding, and SUV driving/riding had the highest exposure concentrations, in some cases exceeding even the U.S. Occupational Safety and Health Administration (OSHA) 30-minute Excursion Limit for asbestos. Only hiking was near ambient asbestos concentrations. For Overall OHV Riding, combining motorcycling, ATV driving/riding, and SUV driving/riding, trailing riders had significantly higher exposures than lead riders. Chrysotile asbestos was the predominant asbestos type found in the air samples, but almost 8% of the phase contrast microscopy equivalent (PCME) asbestos fibers detected belonged to the amphibole asbestos group. When the sampling results were evaluated by the general meteorological conditions of the dates sampling was conducted, "dry", "moist", and "wet", it was observed that asbestos air concentrations were only reduced when it was actively raining. Additionally, comparison of samples collected at the same time by the same individual wearing sampling cassettes set at different heights to simulate adult and child breathing zones showed that the child exposure concentrations exceeded that of the adult sample approximately 64% of the time.

When the activity-based sampling asbestos concentrations were applied into typical use scenarios and excess lifetime cancer risks were estimated, the EPA report found that using the EPA Integrated Risk Information System (IRIS) toxicity value for asbestos, making five or more visits to CCMA per year over a 30-year period to participate in recreational scenarios of Weekend Riding, Day Use Riding, Weekend Hunting, or Combined Riding/Fence Building could put recreational users at an excess lifetime cancer risk above EPA's acceptable risk range of $1x\ 10^{-4}$ (1 in 10,000) to 1 in 10^{-6} (1 in 1,000,000). The highest IRIS risk estimation, 2 in 1,000 (2×10^{-3}), was based on the 95% upper confidence limit exposure concentration for 12 visits per year for the recreational Weekend Rider (EPA 2008).

Using the State of California Office of Environmental Health Hazard Assessment (OEHHA) toxicity value for asbestos, even one visit per year for recreational scenarios of Weekend Riding, Day Use Riding, Weekend Hunting, or Combined Riding/Fence Building put users above EPA's acceptable risk range. The higher risks reflect the fact that the OEHHA asbestos toxicity value is 8 times larger than the value in IRIS. At the high end of the risk range, excess lifetime cancer risk estimations using the OEHHA toxicity value and the 95% upper confidence limit concentration indicate that recreational users riding motorcycles 12 weekends per year could have as much as a 1 in 100 (1×10^{-2}) lifetime chance of developing asbestos related cancer.

As with any assessment of risk, there are assumptions and variables that can cause the calculations to either overestimate or underestimate the actual risk. The CCMA risk assessment report contains a more detailed discussion of the exposure and toxicity parameters which affect the calculations of estimated risk. The CCMA assessment may overestimate or underestimate risk if EPA's measurements of exposure and the assumptions of exposure frequency are either greater or less than actual conditions.

Additional uncertainty is introduced because both the IRIS and the OEHHA toxicity values for asbestos are based on epidemiological studies of work place exposures to intermittent high asbestos concentrations over extended periods. While the concentrations measured for activities at CCMA are significantly elevated, the exposure is infrequent and episodic. Because there is no clear mode of action for asbestos-induced disease and no threshold for cancer health effects, using a direct time-weighted extrapolation from the longer, chronic occupational exposures to shorter-term, episodic exposures may underestimate or overestimate the risk. The risks could be much lower because the exposures may be too infrequent or the total retained fiber burden too few to initiate the asbestos disease process.

On the other hand, the EPA risk calculations may underestimate the risk because take-home exposures and non-cancer health effects were not considered. Asbestos can adhere to equipment, clothes, and the interior and exterior of vehicles, and can be tracked out of CCMA resulting in future exposures to CCMA users, families, and communities. The offsite exposure could increase the risk, proportional to the time of exposure and the concentration of asbestos tracked offsite. Perhaps most important, there is currently no reference value for calculating non-cancer risks from asbestos exposures and non-cancer risks were therefore not addressed in the EPA assessment. However, epidemiological studies indicate that non-cancer respiratory health effects from exposure to asbestos can be significant and in some studies exceed the cancer cases. Therefore, the general probability of developing disease from exposure related to activities at Clear Creek may be underestimated in the EPA risk estimations.

Asbestos is a known human carcinogen. Despite the uncertainties inherent in risk assessment, the evaluation of asbestos exposures and risks at the Clear Creek Management Area led EPA to conclude:

- The Activity Causes the Exposure – The concentration of asbestos in the breathing zone is directly related to the degree that an activity disturbs the soil and creates dust.

- Children Are of Special Concern – In a majority of the samples, the concentration of asbestos measured in the child's breathing zone exceeded the asbestos concentration in the companion adult sample. Further, a child's life expectancy exceeds the latency period for asbestos-related disease.

- The Higher the Exposure, the Higher the Risk – The activities with the highest exposure - motorcycling, ATV riding, and SUV driving/riding - had the highest corresponding excess lifetime cancer risk.

- Reducing the Exposure Will Reduce the Risk – The risk of developing asbestos-related disease is dependent on the level of exposure, the duration of exposure, and the time since first exposure.

- Reducing exposure will reduce the risk of developing asbestos related cancers and debilitating and potentially fatal non-cancer disease.

In response to the CCMA Asbestos Exposure and Human Health Risk Assessment (2008), BLM issued a temporary closure order simultaneously on May 1, 2008 that closed 30,000-acres within the CCMA's Serpentine ACEC to all public use and entry. The closure order was published in the Federal Register (Volume 73, Number 85), pursuant to 43 CFR 8364.1, to protect public land users from human health risks associated with exposure to airborne asbestos in the CCMA while the BLM completes this Resource Management Plan.

3.2.4.2 Illegal Dumping and Illicit Drug Operations

Over the years, substantial marijuana garden encampments have been discovered by law enforcement authorities in CCMA. Law enforcement confiscate the illegal product, but large amounts of solid waste, garbage, food, clothing, fertilizers, pesticides, and batteries remain on public lands. Many of these types of waste also contain hazardous materials that are a potential source of contamination of the air, water, and soil resources in CCMA. Similar waste piles are dispersed throughout CCMA due to illegal dumping of household chemicals and solid waste.

3.2.4.3 Abandoned Mine Lands

Some acid mine drainage has been characterized with respect to the mines located in this management area. Hazards associated with these mines include open shafts and adits, tailings piles, and abandoned equipment. Other hazardous materials of concern that may be found in the CCMA abandoned mine lands include cinnabar (mercury ore) deposits and piles of asbestos tailings that have been dispersed throughout the region by wind, water, and anthropogenic sources of disturbances. Current conditions and BLM goals for reclamation of some abandoned mine lands in CCMA are identified below.

Aurora Abandoned Mine Lands Project

The Aurora mine was active from 1853 up to the 1950's. Historic photographs of the mine showed that several structures and an improved water source for the mine along with two large metal water tanks. These structures and the furnace used to retort the ore were previously removed, so no above ground structures were left when restoration activities began in the summer of 2000.

Remediation of the site included the removal of 8,000 cubic yards of mercury retort waste rock (calcines) and placement into a repository located nearby. All unearthed mining debris was also placed into the repository. The disturbed areas were recontoured and capped with two to three feet of non-mercury native soil. Native plant seeds from the adjacent vegetated areas were spread out under several inches of weed-free rice straw. Rice straw hay bales were staked in the ground to control erosion and allow for the germination of the native plants. However, severe winter storms have caused the ephemeral drainage that was recontoured through the site to overflow and cut into the cap material causing additional erosion concerns.

Alpine Abandoned Mine Lands Project

This mine was active from 1910 up to the 1950's and consisted of several shallow open cuts and 100 feet of subsurface workings. Historic photographs of the mine in operation indicated several structures were present which may have housed the miners. However, very little evidence of these structures remained just prior to the site cleanup. During mine operations, the calcines were dumped into the steep ravine and, over time, a substantial portion of the wastes were washed downstream. Therefore, the remediation plan called for the excavation and entombment of 3,000 cubic yards of calcines and other mining debris.

In 2001, the calcines were removed and transported to a repository on the west side of the mill site. The retort wastes were capped with two-three feet of native (non-mercury ore) soil, seeded with the native plants and then covered with the weed-free rice straw. The excavated calcine pit was recontoured with native soil, reseeded with the same native plants and five rows of rice bales were staked along slope contours to reduce stormwater runoff.

Jade Mill Site Abandoned Mine

The Jade Mill Site began operations around 1900, and based on the volume of retort tailings, produced an estimated 50 flasks of mercury. In the 1970's the site was used for gemstone production. The mill site contained two brick and one metal retorts estimated at about 500 cubic yards. Site restoration began in the Spring of 2001 and was completed in the Summer of the same year. All structures were removed, all retort brick and calcine wastes were buried on site and capped. The site was fenced and seeded.

Following the discovery of San Benito evening primrose in 1960 (*Camissonia benitensis*; CABE) and subsequent listing by the Fish and Wildlife Service as Threatened in 1985, the BLM began making efforts to protect the species' habitat. Habitat protection efforts included establishing formal campgrounds and staging areas and fencing habitat to exclude OHV and other recreation impacts. Formal campgrounds established included Jade Mill. Upper Jade Mill campground is underlain by nonserpentine soils and thus, BLM first identified the Jade Mill site for development of recreation facilities in the Hollister RMP (BLM, 1984). Subsequently, BLM's policy has been modified to not encourage use within Jade Mill area due to the asbestos hazard. However, the Upper Jade Mill site remains a favorite camping location and consistently receives heavy use.

Conversely, Lower Jade Mill is underlain by serpentine soils and is regarded as potential habitat for the species. Due to the impacts of heavy OHV traffic and camping, this area has been prevented them from supporting San Benito evening primrose. There is also a known prehistoric archaeological site within the Jade Mill vicinity; CA-SBn-64 is a small lithic scatter that was extensively impacted by indiscriminant recreational use as early as 1975. The site had probably been impacted much earlier in time, during the historic mining and logging interests of the 19th and early 20th centuries. Until the remediation of Jade Mill, the area was not a likely candidate for the encouraged use of camping. Since the millsite was removed, camping pressures have moved into the site area and created the need for restoration of potential habitat for the San Benito evening primrose and better protection of the remnants of site CA-SBn-64.

Xanadu Mill Site Abandoned Mine

The Xanadu Mil Site was a small commercial operation within a riparian zone that produced very little calcines. However, the site was very heavily used by the visiting public for camping and target shooting, and the retort area was contaminated with mercury. The remediation plan called for the removal and on-site encapsulation of the milling retort oven debris, contaminated soils and building remnants.

Larious Canyon Mill Site Abandoned Mine

The Larious Canyon mill site was another small operation with a retort oven similar in size and construction to that of the Xanadu Mill site. This site is within a perennial riparian zone. Cleanup action was especially necessary to reduce downstream transport of mercury contaminated sediments. The remediation plan was developed for entombment of all retort oven materials and associated calcines, to remediate both remove the human health and environmental impacts.

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3.3 Travel and Transportation Management

3.3.1 Introduction

Travel and transportation management is aimed at providing adequate public and administrative access to BLM lands for visitor use and for management of those lands, while regulating travel to protect public safety, prevent damage to resources, and resolve conflicts among users. Central to travel management are OHV designations. All public lands are required to be designated as open, limited, or closed to motorized vehicle access (43 CFR 8342.1).

Areas designated as "open" have primarily been selected for intensive motorized vehicle recreation and do not have compelling resource protection needs, user conflicts, or public safety issues that warrant limiting cross-country use. On lands designated as "limited", cross-country travel is prohibited and travel is limited to designated "open" routes. The network of routes available and the terms and conditions of use on those roads and trails are usually identified on published maps. In areas designated as closed, no motorized or vehicle use is permitted. Cross-country travel by foot or horse is usually permitted in all areas regardless of route designation.

A network of Federal, State, and County roads provide access to the Planning Area. Currently, public lands in the area are generally accessible by motorized vehicles to agency personnel (for resource management), to commercial enterprise (for use or extraction of public resources), and to the general public (for recreation and enjoyment of public lands). The population in the Planning Area is overwhelmingly urban, and rural areas are becoming increasingly less common as urbanization expands, especially in the San Francisco Bay Area, Central Coast communities, and in the San Joaquin Valley. Therefore, the wildland experiences in the Clear Creek Management Area are increasingly valuable as the supply of open space decreases in the region.

There is a need to balance access to public lands with resource management and protection, including public health and safety. Areas where there is no public motorized access or access can be improved include the Condon, Tucker, and Cantua management zones. In southern Fresno County, the BLM-managed portion of Joaquin Ridge is an area with limited roads, where public access is restricted by private lands and BLM-locked gates. As a result, there has been a trend of route proliferation, redundancy, and frequent trespasses and other unauthorized uses on BLM and private lands in the region.

Whenever possible, BLM makes the public lands accessible, whether by motorized vehicles or non-motorized means; and reasonable access is provided to persons engaged in valid uses such as mining claims, mineral leases, livestock grazing, and other land use authorizations.

3.3.2 Regulatory Framework

Current vehicle management is based on the 1984 Hollister RMP and associated amendment, including the BLM's 2006 Record of Decision for CCMA RMP Amendment and Route Designation. This plan addressed a variety of concerns related to vehicle use, roadways, and resource protection, and provided guidelines for future road improvements, maintenance activities, and management decisions. The baseline for analysis of transportation in this RMP/EIS is the designated route network that was approved in the 2006 Record of Decision for the CCMA RMP Amendment and Route Designation.

Vehicle use in the Planning Area is managed under the direction and authority in 43 CFR Part 8340 "Off-Road Vehicles," and Subpart 8342, "Designation of Roads and Trails." The off-highway vehicle (OHV) regulations apply to use of routes by the general public. Certain other routes may be open to private landholders, and grazing or other permittees, to meet specific access needs and/or legal rights.

3.3.3 Regional Setting

A network of Federal, State, and County roads provide access to the Planning Area. Currently, public lands in the area are generally accessible by motorized vehicles to agency personnel (for resource management), to commercial enterprise (for use or extraction of public resources), and to the general public (for recreation and enjoyment of public lands). The population in the Planning Area is rural, although visitor use is heavily influenced by urban centers nearby, especially from the San Francisco Bay Area, other Central Coast communities, and the San Joaquin Valley.

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3.3.4 Current Conditions and Trends

3.3.4.1 Designated Routes and Trails

BLM has designated approximately 248.5 miles of roads and trails "open" for vehicle use in the CCMA. The authorized vehicles include two-wheeled drive vehicles, four-wheeled drive trucks and jeeps, all-terrain or universal-terrain vehicles (ATV/UTV), and motorcycles. The vast majority of routes are unpaved, four-wheeled drive recommended, jeep trail, ATV/UTV trail, and single track trails; although there is approximately 3 miles of paved road formerly used to access the KCAC mine. Of the 248.5 miles of routes currently designated for vehicle use in CCMA, 105 miles are single track which are accessible by motorcycle, 35 miles are trails which are accessible by ATV/UTVs and motorcycles, 80 miles are jeep trails, four-wheeled drive recommended, and the remaining 26 miles are improved/unpaved, or paved roads (3 miles) that are accessible by all these vehicle types.

Off-highway vehicle (OHV) use is the most prevalent recreation activity in the CCMA with almost all of the use occurring within the 30,000-acre Serpentine ACEC. The majority of the OHV use occurs within the lower six miles of Clear Creek Canyon. While motorcycle and ATV riding are the most common OHV recreation activities, four-wheeled drive vehicles and ATV/UTVs are also used for access to a variety of other recreational activities in CCMA, including hunting, rockhounding, and hiking. In addition, OHVs are also used on CCMA public lands for to access particular areas, such as communication sites, mining claims, and private in-holdings; and for activities requiring a permit, such as energy and mineral exploration and livestock grazing,

A combination of regulatory signs, route number signs, directional signs, and fencing is used to direct visitors along the trails identified on the user map. BLM park rangers and law enforcement patrol the CCMA, providing visitor assistance and information, and enforcing Federal and State rules and regulations, as appropriate.

3.3.4.2 Maintenance & Operations

Road system management has focused on maintaining major access roads, which generally receive most of the recreation traffic. Corrective maintenance occurs as problems are identified and funds permit. Road construction has been limited to improving or upgrading road segments to improve access or to alleviate maintenance or environmental problems. Best management practices include drainage improvements, construction of rolling dips, water bars, rock armored/hardened stream crossings, hardened sills, and half-pipe bridges.

Logistically speaking, CCMA is a very unique and challenging place to manage. Transport time from the Hollister Field Office (HFO) is approximately 1 hour to the BLM's decontamination facility (Section 8). A stop is made at the Section 8 administration site to obtain personal protective equipment (PPE), work gear and tools, air sampling equipment, etc. This usually takes 0.75-1.0 hrs. Transport to the CCMA entrance is 0.5 hrs. Transport to the more remote sites in CCMA from the entrance can take up to 2 hrs, depending on weather and road conditions. Once work is completed for the day, employees return to Section 8, about 1.5-2.5 hrs. At Section 8, decontamination of vehicles, gear and OHV's takes 1-1.5 hours, followed by a decontamination shower and completion of air sample calibration, another 0.5-0.75 hrs. At this point, an hour drive back to HFO completes the cycle. This cycle does not take into account mechanical breakdowns or other logistical issues typical of remote locations.

The non-project related portion of a work day takes approximately 6 hours. That means only 4 hours of actual mission critical work is accomplished during a 10 hour work day. This typically doubles or triples the time necessary to complete projects. Frequently, a 12-14 hour work day is utilized to offset the logistical issues surrounding the accomplishment of work within CCMA. While making for a more efficient CCMA work schedule, cost is greatly increased through overtime compensation. Decontamination facility maintenance and employee health monitoring also greatly contribute to project costs.

3.3.4.3 CCMA Public Highways

Congress enacted Revised Statute 2477 in 1866 to grant the right-of-way for construction of highways over public lands that were not reserved for public purposes. R.S. 2477 was repealed with the passage of FLPMA of 1976. However, highways established between 1866 and 1976 were grandfather as valid existing rights. In recent years, there has been growing debate and controversy regarding whether or not certain highways were authorized pursuant to R.S. 2477 and, if so, the extent of the rights obtained.

However, issues related to R.S. 2477 are outside the scope of BLM's land use decisions for transportation and travel management on CCMA public lands because the U.S. Tenth Circuit Court of Appeals ruled that the validity of R.S 2477 claims can only be determined through the courts. Therefore, the Proposed RMP does not address the extent of these rights on public lands in the CCMA, as noted in Section 1.3.2.4.

The following roads; Clear Creek (R1), Mexican Lake (R11), Wildass (R15), and Sawmill Creek (T158) have been informally identified as "County Roads" for a number of years. However, no record exists that San Benito County has a right of way or any legal right to these roads. The BLM has no record that the County established a right-of-way on the 26.1 miles of roads. The County has provided no information to the BLM to assert any rights-of-way and takes no responsibility for the roads, so by default these are Federal roads.

Furthermore, San Benito County abandoned road maintenance on these roads in 1994 and has not conducted maintenance on them for 16 years. Lack of maintenance has resulted in impacts to natural resources, including water quality, habitat for special status species, and public health and safety.

Under the current conditions, public health and safety are being adversely affected by the lack of appropriate road maintenance, resulting in multiple injury accidents and at least one fatality on CCMA roads. Unlimited use of these roads also exposes the public to airborne asbestos and poses a health hazard.

Nevertheless, BLM, existing rights-of-way holders, and private property owners with in-holdings still need reliable access to the area for resource management and other purposes, but are frequently impeded due to the unmanaged condition of the roads. Improper road maintenance can also lead to excessive sedimentation and transport of toxic materials from the CCMA into various watersheds. This is affecting BLM's ability to comply with water quality standards for mercury and sediment within the CCMA. Stream crossings and riparian areas are being affected by the lack of maintenance. A 1995 study by a BLM contractor identified roads within the CCMA as the primary contributor of sediment into watersheds within the area. Maintenance proposed by BLM in the PRMP/FEIS would reduce sedimentation from these roads.

The County's failure to maintain these roads conflicts with resource management goals and the overarching laws and regulations governing BLM. Therefore BLM acknowledges its' authority and jurisdiction over the aforementioned roads. BLM has the appropriate equipment and staff to perform maintenance and repairs and will maintain a public route system that would connect designated routes in CCMA with the network of Federal, State, and County roads in the region. BLM would also to provide access for valid existing rights of way, mining claims, leases, and private landowners. Refer to section 2.3.3 for other management actions related to travel and transportation management.

3.3.5 Trends and Forecast

During the 1990's the Department of Parks and Recreation estimated there are over 100,000 miles of OHV roads and trails at more than 200 sites on public lands managed by the federal, state, and local county governments in California. During this same time, the State reported a 52 percent increase in visitation to the six main State Vehicle Recreation Areas (SVRAs). Hollister Hills SVRA is one of the most heavily used OHV state parks and is closest to the CCMA.

Studies done by the State of California, Off-Highway Motor Vehicle Recreation Division, indicate that over the last twenty years the number of registered OHVs has increased statewide. In the same time period, the available areas for riding have decreased significantly. For example, in the southern desert areas, there was a 40 percent decrease in available lands due to the California Desert Protection Act of 1994.

The US Forest Service prepared a report in June 2005 titled Off-Highway Vehicle Recreation in the United States, Regions and States: A National Report from the National Survey on Recreation and the Environment (NSRE). According to this report, driving motor vehicles 'off-road' became one of the fastest growing activities in the country from 1982 to 2000-01 Growth in OHV use from an earlier study conducted in 1994-1995 and a 1999 -2000 NSRE report, showed a 32-percent increase. This represented growth from about 27.3 million OHV users in 1994-1995 to about 36.0 million in 1999-2000 (USDA 2005). The 2005 study reports "a slightly higher growth rate continued from 1999-2000 to the most recent NSRE interviewing period in late 2004. This resulted in growth in the number of OHV participants during that time period from 36.0 million to 51.0 million, a 42 percent increase." Further, the study determined there has been consistent growth in OHV use between 1999 and 2004, with conservative estimates on OHV use from the combined or pooled NSRE 1999-2004 sample of more than 73,000 individuals to arrive at an estimate of 39.7 million OHV participants, 18.6 percent of the population, or almost 1-in-5 people age 16 and older.

Nevertheless, urban sprawl has increased recreational use on BLM lands near urban zones. This has led to overcrowding of some recreation areas, accompanied by a deterioration of resources. With the state areas being heavily impacted and open areas harder to find, the BLM lands will likely see increased legal and illegal OHV use. The OHV-related environmental impacts from increasing OHV use on the CCMA route network would affect hazardous materials emissions, soil erosion, damage to vegetation, wildlife habitat fragmentation, and the spread of invasive species. Unauthorized OHV use is also likely to damage riparian zones and habitat for threatened or endangered species.

Table 3.3-1. Comparison of Dust Mitigation Measures for Reducing Chrysotile Emissions From Unpaved Road

Mitigation Measure	Initial Cost $1000/mile	Annual Maintenance Cost $1000/mile	Ten Year Total Cost $1000/mile	Frequency of Application	Adverse Environmental Impacts
Base-Rock [1,2,3,4]	247	26	481	Replenishment at 1" annual avg.	None
Single-Coat Chip Seal[1,2,3,4]	301	10	391	Patch/repair Annual-10 year life	None
Double-Coat Chip Seal[1,2,3,4]	328	5	373/209[7]	Patch/repair Annual-20 year life	None
Petroleum Products	44[5]/59[2]	88	836[5]/851[2]	6 month intervals	Yes
Lignosulfonate	19[5]/34[2]	19	190[5]/205[2]	12 month intervals	None
Calcium Chloride	15[5]/30[2]	45	420[5]/435[2]	3 applications/year	Yes
H2O/Wetting Agents	42[5]/57[2]	1260	~ $10 million	30[+] applications/year	None
Liquid Copolymer	20[5]/35[2]	8	107	12 month intervals	None
Asphalt Cement[1,2,3,4]	501	3	528/194[7]	Patch/repair Annual-30 year life	None

Table modeled on EPA report "450/3-81-006, Assessment & Control of Chrysotile Asbestos"

1. Calculation includes a 25% HazMat contingency allowance.
2. Sub-grade preparation included at $15,000/mile.
3. Base rock application included at $47,000/mile.
4. Logistics and overhead for contract administration included at 15%.
5. Materials cost only. Delivery costs and labor costs vary.
6. 20 year cost = initial cost divided by 2 + 9 years annual maintenance = cost/10 years.
7. 30 year cost = initial cost divided by 3 + 9 years annual maintenance = cost/10years.

Table 3.3-1 (cont.). Comparison of Dust Mitigation Measures for Reducing Chrysotile Emissions From Unpaved Road

Design Criteria. Roads are 12-24 feet wide, with an 18 foot average. Initial base-rock application is at 6 inch depth. Does not include cost for engineered drainage control (culverts). Dust suppressant treatment does not include product delivery to site. Initial improvement of roads is necessary for the application of any dust mitigation measures. Road conditions at CCMA are in a severely degraded state and would require a sub-grade preparation and initial application of base-rock at a six inch depth. Most cost estimates, where indicated, also include costs associated with Hazardous Materials work, such as decontamination of equipment and personnel. The profit and overhead calculation is a conservative estimate of costs associated with the administration of contracts. Most products require multiple applications per year. Base-rock is calculated at $113,666 materials cost per mile. Single coat chip-seal is calculated at $54,000/mile. Double coat chip-seal is calculated at $81,000/mile. Petroleum products are calculated at $44,000 materials cost per mile. Lignosulfonate is calculated $19,000 materials cost per mile. Calcium Chloride is calculated at $190 materials cost per ton at ~60 tons per mile. Wetting agents is calculated at $42,000 per mile and includes materials cost and labor, etc. Liquid Co-polymer is calculated at $20,000 materials cost per mile. Asphalt Cement is calculated at $254,000.

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3.4 Biological Resources – Vegetation

3.4.1 Introduction

Vegetation resource is essential for, or adds aesthetic value to, livestock grazing, wildlife habitat, soil stability, recreation, hunting, and sightseeing. The Planning Area consists of structurally and compositionally diverse plant communities that include barrens completely devoid of vegetation, grasslands, chaparral, oak woodland, and conifer forest. Variations in climate, terrain, geology, and soils support a mosaic of unique plant communities and rare species. The 1995 Clear Creek Management Area Proposed Resource Management Plan Amendment and Final Environmental Impact Statement identified 23 special status and sensitive plant species occurring within the Clear Creek Management Area that require special management attention. Threats to vegetation resources include unauthorized off-highway vehicle (OHV) travel, inappropriate livestock grazing, surface disturbances from mineral extraction, and noxious and invasive weed establishment.

3.4.2 Regulatory Framework

Because vegetation is central to many management decisions, there are several regulatory directives that influence its management. These include the Endangered Species Act (ESA) (1973), the Taylor Grazing Act (1934), and Rangeland Health Standards and Guidelines (approved on July 13, 2000).

3.4.3 Regional Setting

The CCMA overlays two primary geologic units including 1) the New Idria serpentine mass, which forms the core of the management area (32,000 acres total), and 2) a nonserpentine sedimentary rock complex which surrounds the serpentine mass (42,000 acres total). The Serpentine ACEC boundary encompasses the New Idria serpentine mass. The Tucker, San Benito River, Condon, and Cantua Zones are composed almost entirely of the nonserpentine sedimentary rock complex. Topography is rugged with an elevation range of 1,830 at Pine Canyon to 5,241 feet on San Benito Mountain. The climate, like most of California is classified as Mediterranean, punctuated by cool, wet winters and hot, dry summers. Annual precipitation occurs primarily as winter rain with some snow occurring most years at the highest elevations on San Benito Mountain. Average annual precipitation in the CCMA is 12 inches.

3.4.4 Current Conditions and Trends

3.4.4.1 Inventory

Soil type (serpentine vs. nonserpentine) and topography strongly influence the diversity of plant communities within the CCMA. Recent vegetation mapping of the CCMA (Evens *et al.* 2006) revealed high vegetation diversity with nine tree-overstory alliances, thirty shrub-overstory alliances, ten herbaceous alliances, and one rock outcrop/barrens association (ref. Map 3, Appendix I). Major vegetation communities (series) as defined by Sawyer and Keeler-Wolf (1995) include “Coulter pine”, “leather oak”, “mixed willow”, “foothill pine”, “chamise-wedgeleaf ceanothus”, “California annual grassland”, “mixed saltbush”, “blue oak”, “interior live oak”, and “California buckwheat”. Two major unique vegetation series not described in Sawyer and Keeler-Wolf were added to the list due to their prominence within the Serpentine ACEC (New Idria serpentine mass). Those vegetation series include “serpentine willow” and “serpentine barrens.” “Serpentine willow” series dominates serpentine riparian zones within the Serpentine ACEC. “Coulter pine”, “leather oak”, “serpentine barrens”, “foothill pine”, and “chamise-wedgeleaf ceanothus” series dominate serpentine upland areas within the Serpentine ACEC (Figure 1). The higher elevations of San Benito mountain, located within the ACEC, support a unique conifer forest composed of foothill pine (*Pinus sabiniana*), Coulter pine (*Pinus coulteri*), Jeffrey pine

(*Pinus jeffreyi*), and incense cedar (*Calocedrus decurrens*) (Figure 2). "Mixed willow" series dominates nonserpentine riparian zones outside of the ACEC. "foothill pine", "chamise-wedgeleaf ceanothus", "California annual grassland", "mixed saltbush", "blue oak", "interior live oak", and "California buckwheat" series dominate nonserpentine upland areas outside of the Serpentine ACEC (Figure 3).

Vegetation types may be generally grouped as "serpentine riparian," "serpentine upland," "nonserpentine riparian," and "nonserpentine upland" types. Table 3.4-1 summarizes the vegetation communities (series) that exist within the CCMA and how they are categorized for analysis as "serpentine riparian," "serpentine upland," "nonserpentine riparian," and "nonserpentine upland" types. Table 3.4-2 lists the vegetation alliances within the CCMA as identified by Evans *et al*. (2006). Table 3.4-1 shows which vegetation alliances are associated with the different vegetation communities.

Figure 1. Typical vegetation types within the Serpentine ACEC (New Idria serpentine mass). Serpentine chaparral (foreground); Serpentine barren (middle-ground); Conifer forest (background, top of ridge).

Figure 2. San Benito mountain conifer forest within the Serpentine ACEC. San Benito Mountain Research Natural Area.

Figure 3. Typical vegetation types of the nonserpentine Franciscan, Moreno, and Panoche complexes outside of the Serpentine ACEC.

Table 3.4-1. Vegetation communities in the planning area. * - Vegetation communities follow those designated by Sawyer and Keeler-Wolf (1995). † - designations applied by the BLM Hollister Field Office to represent unique vegetation types found within the Serpentine ACEC on the New Idria serpentine mass.

Vegetation community*	General vegetation type	Dominant species	Vegetation alliances (see Table 3.4-2)	Soil type: Serpentine	Soil type: Nonserp.	Elevation (feet)	Management Area (%)
Serpentine willow†	**Serpentine riparian**	Brewer's willow, hoary coffeeberry	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X		2800-4500	1
Coulter pine	**Serpentine upland**	Coulter pine, foothill pine, Jeffrey pine, incense cedar	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X		3400-5241	5
Leather oak	**Serpentine upland**	Leather oak, bigberry manzanita, pointleaf manzanita, hoary coffeeberry, rabbitbrush, chamise	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X		2800-5241	25
Serpentine barrens†	**Serpentine upland**	None	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X		2800-5241	10
Foothill pine	**Both Serpentine & Nonserpentine upland**	Foothill pine, Coulter pine	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X	X	1830-5241	10
Chamise-wedgeleaf ceanothus	**Both Serpentine & Nonserpentine upland**	Chamise, wedgeleaf ceanothus, mountain mahagony, scrub oak, bigberry manzanita	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50	X	X	2600-5241	20
Mixed willow	**Nonserpentine riaprian**	Cottonwood, arroyo willow, mulefat	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-3600	1
California annual grassland	**Nonserpentine upland**	Brome, wild oats, medusa head, filaree, lupine, tarweed	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-3600	6
Mixed saltbush	**Nonserpentine upland**	Saltbush	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-2400	1
Blue oak	**Nonserpentine upland**	Blue oak, foothill pine, California juniper	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-3600	5
Interior live oak	**Nonserpentine upland**	Interior live oak, toyon, California buckeye	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-3600	2
California buckwheat	**Nonserpentine upland**	California buckwheat, black sage, rabbitbrush, matchweed, chamise	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50		X	1830-4500	15

Table 3.4-2. Vegetation alliances associated with vegetation communities (see Table 3.4-1) in the planning area. Vegetation alliances follow those designated by Evans *et al*. (2006).

	Alliance	Association		
	Tree-Overstory		Soil type	
Alliance #	Conifer Alliances		Serpentine	Nonserp.
1	**Pinus coulteri**			
		Pinus coulteri -Calocedrus decurrens /Quercus durata -Arctostaphylos glauca	X	
		Pinus coulteri -Calocedrus decurrens /Rhamnus tomentella /Aquilegia eximia	X	X
		Pinus coulteri -Calocedrus decurrens-Pinus jeffreyi/Quercus durata	X	
		Pinus coulteri -Pinus sabiniana /Quercus durata -Arctostaphylos pungens	X	
		Pinus coulteri /Arctostaphylos glauca	X	X
		Pinus coulteri /Quercus durata	X	
2	***Pinus coulteri-Quercus chrysolepis***			
		No association defined	X	X
2	***Pinus jeffreyi***			
		No association defined	X	
4	***Pinus sabiniana***			
		Pinus sabiniana /Juniperus californica /Annual-Perennial Herb		X
	Hardwood Evergreen Alliances			
5	***Quercus chrysolepis***			
		Quercus chrysolepis	X	X
6	***Quercus wislizeni -Quercus chrysolepis***			
		Quercus wislizeni -Quercus chrysolepis	X	X
	Hardwood Deciduous Alliances			
7	***Populus fremontii***			
		No association defined		X
8	***Quercus douglasii***			
		Quercus douglasii-Pinus sabiniana /Cercocarpus betuloides		X
		Quercus douglasii-Quercus wislizeni-Pinus sabiniana	X	
		Quercus douglasii /Annual-Perennial Herb	X	X
		Quercus douglasii /Ceanothus cuneatus		X
		Quercus douglasii /Ericameria linearifolia -Juniperus californica	X	X
		Quercus douglasii /Eriogonum fasciculatum /Annual-Perennial Herb		X
		Quercus douglasii /Juniperus californica -Cercocarpus betuloides		X
		Quercus douglasii /Juniperus californica -Quercus john-tuckeri	X	X
9	**Quercus lobata**			
		No association defined		X
	Shrub-Overstory			
	Chaparral Alliances			
10	***Adenostoma fasciculatum***			
		Adenostoma fasciculatum (pure)		X
		Adenostoma fasciculatum Serpentine	X	
11	***Adenostoma fasciculatum -Arctostaphylos glauca***			
		Adenostoma fasciculatum -Arctostaphylos glauca Serpentine	X	
		Adenostoma fasciculatum -Arctostaphylos glauca -Salvia mellifera		X
12	***Adenostoma fasciculatum -Salvia mellifera***			
		Alliance only		X
13	***Arctostaphylos glauca***			
		Arctostaphylos glauca -Quercus durata /Pinus sabiniana	X	
14	***Ceanothus cuneatus***			
		No association defined		X
15	***Ceanothus leucodermis***			
		No association defined		X
16	***Cercocarpus betuloides***			
		Cercocarpus betuloides -Ceanothus cuneatus -Quercus john-tuckeri	X	X
		Cercocarpus betuloides -Juniperus californica /Annual-Perennial Herb	X	X
17	***Cercocarpus betuloides -Eriogonum fasciculatum***			
		No association defined	X	
18	***Prunus ilicifolia***			
		No association defined		X
19	***Prunus virginiana***			
		No association defined		X

	Alliance	Association		
	Shrub-Overstory		**Soil type**	
Alliance #	**Chaparral Alliances**		**Serpentine**	**Nonserp.**
20	***Quercus berberidifolia***			
		No association defined		X
21	***Quercus john-tuckeri***			
		No association defined		X
		Quercus john-tuckeri-Adenostoma fasciculatum	X	X
		Quercus john-tuckeri-Juniperus californica-Ericameria linearifolia		X
		Quercus john-tuckeri-Juniperus californica-Fraxinus dipetala	X	X
		Quercus john-tuckeri-Quercus wislizeni-Garrya flavescens		X
22	***Quercus durata***			
		Quercus durata/Pinus sabiniana	X	
		Quercus durata-Adenostoma fasciculatum-Quercus wislizeni		X
		Quercus durata-Arctostaphylos glauca/Pinus sabiniana	X	
		Quercus durata-Arctostaphylos glauca/Pinus sabiniana		X
		Quercus durata-Arctostaphylos glauca-Garrya congdonii/Melica torreyana	X	
		Quercus durata-Arctostaphylos pungens/Pinus sabiniana	X	
		Quercus durata-Cercocarpus betuloides	X	
	Coastal Sage Scrub Alliances			
23	***Artemisia californica***			
		Artemisia californica-Lepidospartum squamatum /Annual Herb		X
		Artemisia californica-Malacothamnus aboriginum		X
		Artemisia californica /Annual herb		X
24	***Artemisia californica-Eriogonum fasciculatum***			
		Artemisia californica-Eriogonum fasciculatum-Ephedra californica		X
25	***Artemisia californica-Salvia mellifera***			
		No association defined		X
26	***Eriogonum fasciculatum***			
		Eriogonum fasciculatum /Annual grass-Herb	X	X
		Eriogonum fasciculatum-Juniperus californica /Annual-Perennial herb	X	X
		Eriogonum fasciculatum-Yucca whipplei /Annual-Perennial Grass-Herb	X	X
27	***Lotus scoparius***			
		No association defined		X
28	***Lupinus albifrons***			
		No association defined		X
29	***Salvia mellifera***			
		Salvia mellifera-Eriogonum fasciculatum - Eriodictyon tomentosum		X
	Desert Scrub and Desert Transition Alliances			
30	***Atriplex spinifera***			
		Atriplex spinifera /Annual herb		X
31	***Chrysothamnus nauseosus***			
		Alliance only	X	
		Chrysothamnus nauseosus-Juniperus californica /Annual-Perennial Herb		X
32	***Ephedra californica***			
		Ephedra californica /Annual-Perennial Herb		X
33	***Eriogonum heermanii***			
		No association defined	X	
34	***Eriogonum wrightii***			
		Eriogonum wrightii-Eriophyllum confertiflorum/Monardella antonina	X	X
		Eriogonum wrightii-Juniperus californica /Annual-Perennial Herb	X	X
35	***Gutierrezia californica***			
		Gutierrezia californica /Annual-Perennial herb		X
36	***Juniperus californica***			
		Juniperus californica-Ericameria linearifolia /Annual-Perennial Herb		X
	Riparian Scrub Alliances			
37	***Baccharis salicifolia***			
		Baccharis salicifolia-Lepidospartum squamatum-Hazardia squarrosa		X
38	***Salix breweri***			
		Salix breweri/Muhlenbergia asperifolia	X	X
39	***Tamarix* ssp.**			
		No association defined	X	X

	Alliance	Association		
	Herbaceous		**Soil type**	
Alliance #	**Upland Coastal and Coast Range Grasslands**		**Serpentine**	**Nonserp.**
40	***Elymus multisetus***			
		No association defined	X	
41	***Eriogonum nudum***			
		Eriogonum nudum var. *indictum*-*Eriogonum vestitum*		X
42	**Upland Annual-Perennial Herbaceous**			
		No association defined	X	X
43	***Vulpia microstachys***			
		Vulpia microstachys-Plantago erecta		X
	Wet Meadow Alliances			
44	***Carex* spp.**			
		Carex spp.-*Juncus mexicanus-Leymus triticoides*	X	X
45	***Eleocharis macrostachya***			
		No association defined	X	
46	***Juncus mexicanus***			
		Juncus mexicanus	X	X
47	***Phragmites australis***			
		No association defined	X	
48	***Typha latifolia***			
		No association defined	X	X
49	**Serpentine Vernal Pool**			
		Habitat (placeholder)	X	
	Rock/Barren			
50	**Sparsely Vegetated**			
		Pinus coulteri Barren	X	
		Pinus jeffreyi-Pinus sabiniana Barren	X	
		Pinus sabiniana-Pinus coulteri Barren	X	

Vegetation of the CCMA, particularly the Serpentine ACEC, has a long history of human use and impacts. Mining for cinnabar (mercury ore), chromite (chromium ore), asbestos and other minerals since the 1850's, has removed vegetation over large areas. Trees were cut for mine timbers and building construction (Figure 4) and chaparral was cut as cord wood (Figure 5) to fuel the cinnabar retorts (Sloane, 1914) at New Idria which operated from 1854 to 1974. More recent impacts to vegetation (post-1950) have occurred from OHV recreation (Figure 6). Massive disturbances caused by mining, particularly for cinnabar and asbestos, eclipses the vegetation loss due to OHV impacts (Figure 7). Although, one might surmise that the barren landscapes of the New Idria serpentine mass are due to mining or other human impacts, most of the barrens are in fact natural. Serpentine soils are extremely stressful to plant establishment and productivity due to abnormally low nutrient levels and toxic levels of heavy metals (Kruckeberg, 1984; Brooks, 1987). The uniquely-adapted plant species and abundance of barrens found on the New Idria serpentine mass are a testament to the harsh growing conditions imposed by serpentine soils (Figure 8).

Figure 4. CCMA circa 1932. Timber harvesting within the ACEC.

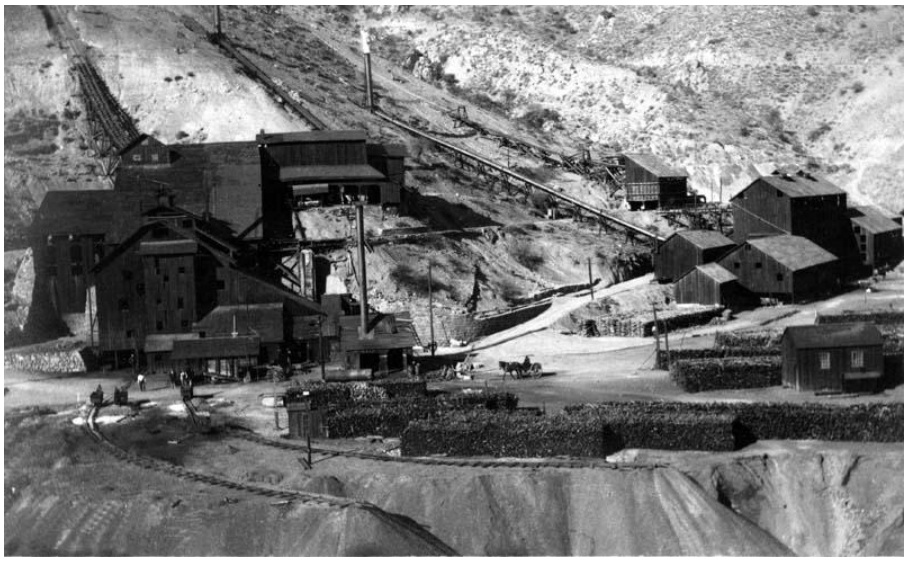
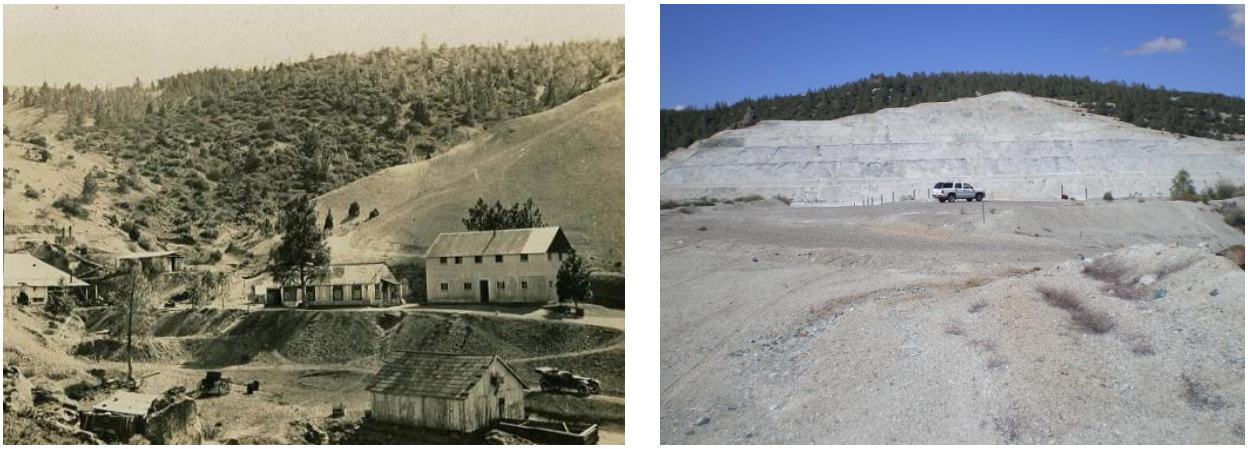


Figure 5. New Idria mine circa 1910. Stacks of cord wood (foreground) obtained from within the CCMA to fuel the cinnabar retorts.

1975 2008

Figure 6. Vegetation loss due to OHV impacts at Indian Hill, one of the most heavily-used OHV areas within the Serpentine ACEC.



Circa 1920. Aurora mine (currently inactive). 2007. KCAC mine (currently inactive).

Figure 7. Vegetation loss from cinnabar (left) and asbestos (right) mining within the Serpentine ACEC.

1932 2007

Figure 8. Natural serpentine barren at Cinnabar Hill (within the Serpentine ACEC) in 1932 and 2007. Note the lack of growth of the pine tree to the right of photo center and the slow decomposition of the log at lower left.

3.4.4.2 Noxious and Invasive Weeds

Noxious and invasive plant species are a serious problem in California. Noxious and invasive plant species are typically non-native, meaning that they were either intentionally or inadvertently introduced into an area not within their natural habitat range. Some invasive plant species were introduced for agricultural, landscaping, or erosion control purposes and later escaped into rangeland or forest ecosystems. Noxious weeds are those listed by State and Federal law and are generally considered to negatively affect agriculture, navigation, fish, wildlife, or public health. Currently, more than 226 noxious plants occur in California and many occur in rangeland or forest ecosystems. In wildland ecosystems, noxious and invasive species may continue to reproduce and become viable populations, displacing native plant species by reducing their productivity, cover, and diversity. Invasive plant species are effective competitors against native plant species for space, soil, water, nutrients, and sunlight.

Noxious and invasive plant species are an increasing problem on BLM lands throughout the West. Currently, their ecological and economic impact on rangelands and forestland is not fully understood or appreciated. Invasive species can rapidly and seriously degrade the quality of rangelands by altering the natural composition and processes of native vegetation, ultimately reducing biodiversity. Noxious and invasive species rapidly displace desirable plants that provide habitat for wildlife, livestock forage, and human aesthetic quality. Some species are poisonous or cause physical injury to wildlife, livestock, and people. Many invasive plant species become highly flammable and flashy fuels as they reach maturity in the summer causing wildland fires to burn faster and hotter than they would normally occur with rangeland or forests. The burned land can then be rapidly recolonized by invasive species, resulting in shorter periods between subsequent fires. Methods to control invasive vegetation include prescribed fire, herbicides, livestock grazing, and other biological methods. Proper management and monitoring are necessary after controlled applications to ensure that desirable vegetation becomes established.

The Serpentine ACEC is relatively free of invasive plant species, owing to the harsh conditions imposed by serpentine soils. Areas outside of the ACEC, in contrast, contain an elevated level of invasive annual species. This is especially true for the annual grassland vegetation type. Of greatest concern is the invasion of noxious invasive plant species from nonserpentine plant communities into serpentine plant communities. Invasive species currently controlled within the CCMA include yellow starthistle (*Centaurea solstitialis*) and common reed (*Phragmites australis*). The San Benito River Zone of the CCMA is regarded as a leading edge for yellow starthistle invasion. Its control there is critical to prevent invasion of the species into areas beyond the leading edge and to improve habitat for rare plant species that exist there including San Benito evening primrose (*Camissonia benitensis*) and slender pentachaeta (*Pentachaeta exilis* ssp. *aeolica*).

3.5 Biological Resources – Fish and Wildlife

3.5.1 Introduction

This section describes the fish and wildlife resources within the Planning Area. Clear Creek Management Area contains a subset of inner Coast Range habitats as well as unique ecosystems associated with serpentine soils. San Benito Mountain is a sky island that has long been regarded as a unique vegetative zone due to the co-occurrence of Coulter, Jeffrey pines, foothill pines, and incense cedar. Table 3.5-1 identifies the habitat types and associated species.

Table 3.5-1 Habitat Types and Associated Species

Habitat Types	Associated Species
California annual grassland	Game species, mountain lion, American badger, coast horned lizard.
Mixed saltbush	San Joaquin kit fox, coast horned lizard.
Blue oak	Game species, mountain lion, bats, important raptor nesting, and roosting.
Interior live oak	Game species, mountain lion, bats, important raptor nesting, and roosting.
Valley oak	Game species, mountain lion, bats, important raptor nesting, and roosting.
Foothill pine	Game species, mountain lion, bats, important raptor nesting, and roosting.
Coulter pine	Game species, migratory birds, mountain lion, bats, important raptor nesting, and roosting.
Chamise-wedgeleaf ceanothus	Game species, mountain lion, big-eared kangaroo rat, coast horned lizard.
California buckwheat	Game species, mountain lion, coast horned lizard.
Leather oak	Game species, mountain lion, coast horned lizard.
Mixed willow/riparian	Migratory passerine birds, native fish, foothill yellow-legged frog, two-striped garter snake, invertebrates, and a high diversity of wildlife species that utilize streams as movement corridors.
Serpentine barrens	Migratory birds
Vernal pool	Fairy shrimp

This RMP addresses key species and their habitat when developing management actions. These species include those of economic interest such as deer, wild pigs, and upland game including California quail and mountain quail; and sensitive, rare, threatened, and endangered species and other species or groups that serve as indicators of ecosystem health or indicate the effects of management activities.

3.5.2 Regulatory Framework

The primary regulatory framework relating to fish and wildlife resources under the management of the BLM includes the Endangered Species Act of 1973, Migratory Bird Treaty Act, and Executive Order 13112 (Invasive Species).

3.5.3 Regional Setting

CCMA is located within a group of interior coast ridges and peaks at the southern end of the Diablo Range. The region is characterized by generally low rainfall, rare snowfall, and frequent winter freezing at the upper elevations. Vegetation in the region ranges from xeric communities dominated by yucca to lush riparian and meadow habitats as well as oak woodlands. Outside of the densely populated San Francisco Bay Area, the Coast Ranges are largely untouched, and therefore support diverse wildlife assemblages. Hunting and wildlife viewing are major public activities throughout the region

3.5.4 Current Conditions and Trends

This section summarizes the current conditions and trends for mule deer, elk, wild pig, cougar, wild turkey, upland game birds, small game species (e.g., rabbits), nongame (e.g., coyotes), and fur-bearing mammals (e.g., gray fox).

Mule deer herd populations are thought to be either stable or in decline as a result of foraging habitat senescence and drought. In past years, local prescribed burning may have contributed to temporary increases in deer herd numbers, but the overall trend is flat or downtrending.

Tule elk are concentrated in the environs Tucker Zone as a result of introductions in areas near Hernandez Reservoir. Elk populations have generally increased as a result of introductions and management agreements between private landowners and CDFG.

The current condition of wild pigs within the Planning Area is unknown. However, they are undergoing range expansion and local populations increase throughout the state. The wild pig was classified as a game mammal in 1957, which requires hunters to obtain license tags to hunt the species. Currently, the hunting season for pigs is year round, with no tag or possession limits. Habitat conditions for the wild pig are also unknown; the species is found within a variety of habitats where water and suitable cover are present. The most abundant population of wild pigs in the CCMA is found in areas of oak woodland and riparian areas. Wild pigs are a popular species for hunters, but they are also considered an exotic, invasive species and they have been removed or eradicated from some public lands to protect sensitive resources..

Mountain lion populations are protected throughout California as a result of a decades-old hunting ban.

Wild turkey populations have grown within California and are fairly abundant within mixed pine-oak woodland habitats. CCMA provides suitable habitat for wild turkey, especially in oak woodlands and riparian areas. Currently, there are approximately 242,000 wild turkeys within California. The species is considered a valuable resource for hunters and wildlife enthusiasts.

Upland game birds such as quail are abundant throughout woodland and grassland habitats with some water source and are likely stable or increasing. Populations of small game, nongame, and fur-bearing mammals found at CCMA are presumed to be generally stable.

3.5.4.1 Fisheries

Water bodies in Clear Creek Management Area are classified as warm water fisheries, and include the upper reaches of the San Benito River as well as Larious, Cantua, San Carlos, and White Creeks and their tributaries. Although a "very limited" trout fishery was present in the headwaters of the San Benito River as late as 1960, no trout have been taken there in decades. Monterey roach (*Lavinia symmetricus subditus*), Hitch (*Lavinia exilicauda harengus*), and Sacramento sucker (*Catostomus occidentalis*) are widespread in the San Benito River watershed, whereas speckled dace (*Rhinichthys osculus*) are present only above Hernandez Reservoir. The upper San Benito River population of speckled dace is one of only two populations left in Monterey Bay-draining watersheds (the other is in the San Lorenzo River watershed) (Smith 2002). Representative fish species presently occupying or having the potential to occupy habitats in CCMA are identified in Table 3.5-2.

Table 3.5-2 Fish Occurring Within Clear Creek Management Area

Species	Status
Monterey roach (*Lavinia symmetricus subditus*)	Nongame; CDFG-SSC

Species	Status
Hitch (*Lavinia exilicauda harengus*)	Nongame
Sacramento sucker (*Catostomus occidentalis*)	Nongame
Speckled dace (*Rhinichthys osculus*) (undescribed ssp.)	Nongame

3.5.4.2 Wildlife

Only key species and their habitats are accounted for in management actions and are given consideration in the RMP. These species include those of economic interest, such as upland game birds; game, nongame, and fur-bearing mammals; sensitive, threatened and endangered species; and other species or groups that serve as indicators of ecosystem health or indicate the effects of management activities.

The ecological values of healthy sustainable fish and wildlife populations are increasingly better understood by ecologists and wildlife managers. Wildlife species have unique interspecific relations, which link assemblages of species on a landscape to one another and to specific habitats contained within the landscape. Some of these relationships are as simple as predator-prey and some are more complex. Understanding the important of these relationships is critical during the development of management strategies, and conservation measures taken for one particular wildlife species or habitat must also conserve an entire assemblage of species and their habitat.

Game populations are managed based on habitat condition and the quality of the animals being produced. Population levels are linked to a variety of factors, including vegetation quality and quantity, adequate space, shelter, cover, water distribution, and regional weather patterns and trends such as prolonged drought. Through cooperative transplants from other areas, introduction of game species have historically occurred on lands within or adjacent to CCMA. CDFG formally coordinates these activities with BLM and other public or private entities on a case-by-case basis. Certain management activities may be augmented by cooperative efforts with nonprofit conservation groups.

CCMA supports populations of mountain lions, mule deer, and tule elk herds, and provides habitat for wild pigs, wild turkeys, upland game birds, small game, nongame, and fur-bearing mammals. A summary of the species occurrence, habitat requirements, and management goals is presented below.

Cougar (Mountain Lion)

The cougar (*Puma concolor*) is a North American native and one of North America's largest cats. The status of the mountain lion in California evolved from that of "bountied predator" between 1907 and 1963, meaning monetary incentives were offered for every mountain lion killed, to "game mammal" in 1969, to "special protected mammal" in 1990. Today's population estimate ranges between 4,000 and 6,000 animals.

Mountain lions occupy virtually every ecological zone and habitat type in California, therefore suitable habitat is not strongly constrained by abiotic or botanical features. Instead, mountain lion density is largely dependent on prey abundance. Mountain lions are very powerful and normally prey upon large animals, such as deer, bighorn sheep, pigs, and elk. However, they can survive preying on small animals as well. They usually hunt alone at night. They prefer to ambush their prey, often from behind. They usually kill with a powerful bite below the base of the skull, breaking the neck. They often cover the carcass with dirt, leaves, or snow and may come back to feed on it over the course of a few days. Their generally secretive and solitary nature is what makes it possible for humans to live in mountain lion country without ever seeing a mountain lion. However, mountain lion attacks on humans, some fatal, have increased in recent years.

The mountain lion is the largest carnivore occurring in CCMA and can be expected throughout the area. They generally will be most abundant in areas with plentiful deer. An adult male's home range often spans over 100 square miles. Females generally use smaller areas – about 20 to 60 square miles.

Mule Deer

Mule deer are the dominant ungulate in California. They are found in a variety of habitats rangewide, with some habitat elements are common to all populations, namely, the presence of browse species (mixed-age shrubbery, chaparral, or oak woodland) and sufficient density of undergrowth to provide shelter.

CCMA falls entirely within a single CDFG Deer Management Unit (DMU), Zone A South, unit 110. Mule deer at CCMA are assigned by CDFG to the San Benito deer herd and are members of the subspecies *Odocoileus hemionus columbianus*, the Columbian black-tailed deer. The herd is considered to be resident although some elevational movement likely occurs, and the population is stable or declining. CDFG biologists believe that long-term degradation in habitat condition is largely responsible for population decline. A chief cause of habitat degradation is the predominance of late-seral stage chaparral, which reduces forage for deer. Self-reporting by hunters in 2007 (prior to the emergency closure) indicating buck kills in the environs of CCMA are summarized as follows: Clear Creek = 2; Condon Peak = 3, Fawn Lake = 4, New Idria = 1, San Benito Mountain = 4, San Carlos Bolsa = 2. According to CDFG data, 152 deer were killed in San Benito County in 2007, 18 (11%) of which were recorded as killed on public lands. The locality data provided above suggest that a significant portion of the buck kills occurring on public lands were located in CCMA.

A Proposed Wildlife Management Plan for the New Idria National Cooperative Land and Wildlife Management Area was signed by BLM and CDFG in 1963. The primary species to be managed was deer. Important actions included in the plan were resource inventories and spot kill maps, with other actions to be cleared with the cooperating agencies. The plan also covered water appropriations and improvements. The 1963 management plan was partially implemented, but is generally outdated and needs to be revised in coordination with the CDFG and other interested parties.

BLM and CDFG signed the San Benito Deer Herd Management Plan in 1984 (also incorporated here by reference). The plan identifies a New Idria subunit that includes lands within CCMA. Recommendations for prescribed burning, harvest strategies, and other management tools are provided. In particular, it is recommended habitat improvement projects be concentrated on Condon Peak, Meyers Canyon and San Carlos Bolsa and that OHV use be restricted in those areas. Herds were historically designated by county, i.e. they were delineated by political rather than biological criteria. In recent years CDFG has shifted from the herd-management model and is now focusing on Deer Assessment Units (DAUs).

BLM is signatory to a 2008 Memorandum of Understanding (MOU) with other Federal resources agencies and the Western Association of Fish and Wildlife Agencies (WAFWA) to manage mule deer on public lands, here included by reference. Parties to the MOU agreed to recognize the importance of mule deer in all land use and populations management planning.

Tule Elk

The subspecies of elk that occurs in CCMA is the tule elk (*Cervus elaphus nannodes*). A small portion of CCMA falls within the Southern San Benito County Tule Elk Management Unit. The herd originated from three populations outside of San Benito County: 63 animals from the Owens Valley Independence herd, 57 from the Grizzly Island herd, and 7 bulls from San Luis National Wildlife Refuge. The introductions occurred in 1985, 1986, and 1987, respectively (Rohrer 1988). All of these source populations were themselves the result of prior introductions ultimately originating from the Miller and

Lux Buttonwillow Cattle Ranch in Kern County, which constituted the last remaining population of tule elk following the near-extinction of the species in the 1860's. CCMA falls within the La Panza Elk Hunt Area, which covers portions of San Benito, Monterey County San Luis Obispo counties. Most of the hunting in the La Panza hunt zone occurs on private lands. Private landowners manage for tule elk on large hunting ranches in the immediate vicinity of CCMA, mostly in the environs of Hernandez Reservoir adjacent to the Tucker Mountain Zone. A radiotelemetry study immediately following the 1985-87 introductions found elk rarely using public lands in CCMA.

Tule elk are indigenous to California and once lived in large numbers in California's San Joaquin and Sacramento Valleys. The species' original distribution was quite large, stretching from the Sacramento Valley to the San Joaquin Valley to the Sierra Nevada Foothills in the east to the coast in the west. Market hunting following the Gold Rush dramatically reduced herd numbers. Genetic studies suggest that the tule elk population may have dropped to as few as three animals before being protected by the state of California (Meredith et al. 2007).

In the 1970s the total population numbered about 500 animals with 3 herds; today there are about 3,500 animals with 22 herds. This comeback has occurred because of protective legislation passed by the State in the 1970s. In addition, the Tule Elk State Reserve (formerly the Tupman Reserve) near Bakersfield was established in 1932 to provide a permanent habitat for the elk, and tule elk are protected on other parks and wildlife refuges statewide.

The goals of the CDFG Elk Management Program are to maintain healthy elk herds, reestablish elk in suitable historic range, provide public educational and recreational opportunities involving elk, and alleviate conflicts involving elk on private property.

Wild Horses and Burros

CCMA has no herd units, and no wild free-roaming horses and burros.

Wild Pig

Pigs (*Sus scrofa*) are not native to North America and did not exist in California before the early 1700s. Spanish and Russian explorers and settlers introduced domestic pigs to California and allowed them to forage freely. In 1925, wild boars from Europe were introduced to California by a private landowner for hunting purposes. The wild boars escaped and hybridized with the feral pigs abandoned by Spanish and Russian settlers. Wild pigs now exist in 56 of the state's 58 counties and their numbers continue to increase.

Prior to the mid-1950s, wild pigs were unclassified under State law and could be killed with no restrictions. In 1957, the State legislature designated the wild pig as a game mammal. Although CDFG has not established specific herd units or a designated hunting season for wild pigs in California, hunters are required to have wild pig license tags to hunt wild pigs.

Wild pigs degrade riparian habitat, depress oak regeneration, consume and compete with native fauna, and cause nonnative vegetation to proliferate. Due to their multiple negative environmental impacts, wild pigs were the subject of a successful eradication program at Pinnacles National Monument, which resulted in the removal of 200 feral pigs from a 57^2km area in 2004-2005.

Suitable habitat for wild pigs is characterized by moderate water availability, especially for the creation of mud wallows for heat regulation, and to some extent litter-producing overstory, such as oaks or mature chaparral. Due to these habitat preferences, wild pigs degrade riparian habitat. Wild pigs are present at CCMA and are actively hunted there and on nearby private and public lands.

Wild Turkey

Populations of the non-native wild turkey (*Meleagris gallopavo*) resulting from numerous introductions have grown to become an established part of much of California's mixed pine-oak woodlands. The first introduction of wild turkeys was reported in 1877. Current population estimates for wild turkeys in California place the population at 242,000. An important resource, valued by both hunters and other wildlife enthusiasts, turkeys are an important game bird, and turkey hunting is a growing hunting sport in California.

Throughout the range of wild turkeys, suitable habitat contains a combination of two key components: trees and open grasslands. Trees provide food, escape cover, and roosting sites. Open grasslands provide food and open areas where turkeys can effectively forage while avoiding predation. Lateral cover, associated with nest selection, is commonly provided by shrubs, herbaceous vegetation, and woody debris.

Wild turkey has been identified by CDFG as a game species present at CCMA and turkey sign are abundant near the entrance station on Hwy 25 (San Benito River Zone).

Upland Game Birds

CCMA provides habitat for California (or valley) quail (*Callipepla californica*, mountain quail (*Oreortyx pictus*) and mourning dove (*Zenaida macroura*). The introduced chukar partridge (*Alectoris chukar*) were historically present in CCMA but are not presently hunted there. California quail are present at lower elevations on the fringes of the serpentine regions and are most abundant in the San Carlos Bolsa (Cantua Zone) and south of Condon Peak (Condon Zone). California quail habitat typically contains a combination of brushy vegetation, woodlands, canyons, foothills, and more open grassy habitat with some water supply. Two guzzlers were installed at CCMA in the late 1950's, but only one, near Condon Peak, was documented by CDFG in a 1995 survey. Mountain quail are at low abundance at higher elevations in the vicinity of Santa Rita and Condon Peak (Condon Peak Zone). Hunting pressure is considered to be low by CDFG.

Small Game, Nongame, and Fur-Bearing Mammals

CCMA provides habitat for small game, nongame, and fur-bearing mammals throughout the Planning Area. Suitable habitat for such species typically includes understory for shelter and a mix of grass and herb species for forage (for the herbivorous species). Depending on species, presence of water may or may not be crucial. Small game include desert cottontail rabbit (*Sylvilagus auduboni*), brush rabbit (*Sylvilagus bachmani*), blacktailed jackrabbit (*Lepus californicus*), and western gray squirrel (*Sciurus griseus*). Nongame species include bobcat (*Lynx rufus*), coyote (*Canis latrans*), and California ground squirrel (*Spermophilus beecheyi*). Species classified by CDFG as fur-bearing species that occur in the Planning Area are limited to the gray fox (*Urocyon cineroargenteus*), raccoon (*Procyon lotor*), and American badger (*Taxidea taxus*). BLM rangers have observed deer hunters taking squirrel during drought years when deer are scarce.

Raptors

CCMA includes considerable habitat of value to raptors. Suitable habitat includes mixed understory and grassland where prey animals (small mammals, smaller birds, and reptiles) abound. Most raptors also require trees, tall bushes, or rocks that serve as foraging roosts and nest sites. Threats to raptors include poisoning, vehicle collisions, habitat loss, illegal hunting, illegal trading and egg collecting, power lines and towers, falconry, a reduced prey base, and disturbance of nesting and roosting sites. Adult raptors have few predators and may live for 20 to 30 years. In common with other long-lived species, raptors

have a slow breeding rate and a high mortality among young birds. Approximately one-quarter of raptors survive their first year, and only half of these will reach maturity and raise their own young. With a reduction in adult survivorship due to the abovementioned causes, the population of the affected species declines as a result.

Migratory Birds

CCMA contains unique habitats for migratory birds, particularly the high elevation conifer habitat on San Benito Mountain. Suitable habitat for migratory birds depends on the presence of prey (chiefly invertebrates) and forage (seeds and fruit) as well as nestsites for those species that breed in a particular area. Migratory birds are typically drawn to riparian zones ranging from shrubby willow thickets to tall-canopy cottonwood forests. Other types of woodland and chaparral are also magnets for migratory birds.

The San Benito Mountain Research Natural Area is an important area for scholarly study of migratory birds as well as for recreational bird watching. Some species of note known to breed on San Benito Mountain include Western Tanager (*Piranga lucoviciana*), Nashville warbler (*Vermivora ruficapilla*), and Dark-eyed Junco (*Junco hyemalias pinosus*). Hollister Field Office staff conduct the San Benito Mountain transect for the annual Breeding Bird Survey.

Amphibians

Public concern for declining amphibians has resulted in a number of State and Federal actions, including Congressional funding of amphibian malformation research and numerous agency level actions by USGS, NPS, and USFWS. The foothill yellow-legged frog is presently under intense study by USFS as an indicator species for stream flow regime in drainages impacted by dams. BLM has been a collaborator in a study of chytrid fungus infection in populations of foothill yellow-legged frogs at CCMA, and a recent genetic study has identified the CCMA population as containing several unique mtDNA haplotypes. (Lind 2007, BLM unpublished data) Foothill yellow-legged frogs have been intensively surveyed at CCMA since the 1990's and excellent data are available on presence/absence and abundance of the frog in numerous streams in CCMA that represent several major watersheds, including the Pajaro River and San Joaquin River watersheds.

Other amphibians present in CCMA include the arboreal salamander (*Aneides lugubris*), the Gabilan slender salamander (*Batrachoseps gavilanensis*), California toad (*Bufo boreas halophilus*) and Pacific chorus frog (*Pseudacris regilla*). Take of otherwise unprotected amphibians is permitted by CDFG under a sport fishing license.

Reptiles

Collecting of reptiles is permitted under a CDFG sport fishing license and take is regulated, with limits established for individual species. In the environs of CCMA, reptiles of interest to collectors include California mountain king snakes (*Lampropeltis zonata*), California king snakes (*Lampropeltis getulus californiae*), and gopher snakes (*Pituophis catenifer*). Pacific rattlesnakes (*Crotalus viridis oreganus*) are abundant in the region and present a potential hazard to humans, pets, and livestock but are also subjects of interest to amateur herpetologists. Other species of interest include the sagebrush lizard (*Sceloporus graciosus*), which is confined to higher elevations in coastal regions. Sensitive species that require a special permit from CDFG to collect include the California horned lizard (*Phrynosoma coronatum frontale),* two-striped garter snake *(Thamnophis hammondii),* and Southwestern pond turtle *(Actinemys marmorata pallida).*

Invertebrates

The western fairy shrimp, *(Linderiella occidentalis)*, has been documented from the Spanish Lake vernal pools (Hopkins and Silverman 2004). Although USFWS has determined that the western fairy shrimp is not in danger of extinction, the species is an important indicator of vernal pool habitat and habitat quality.

Table 3.5-3 Wildlife Habitat Conditions in the Planning Area

Species/Group	Habitat Conditions	Comments
Mule deer	Poor-good[1-4]	Population fluctuates with yearly rainfall.
Tule Elk	Poor-good[1-4]	Habitat managed mostly on private lands outside the planning area.
Wild pig	Good[1]	Present in oak woodlands and riparian areas.
Wild turkey	Fair[1]	Numbers increasing throughout state
Mountain lion	Fair[2,3]	Numbers increasing throughout state, conflicts with humans continue to increase as habitat and subpopulations become further fragmented
Upland game birds	Good[1]	Populations subject to wide annual fluctuations, primarily due to timing and amount of rainfall
Small game, nongame, fur-bearing	Good[1,4]	Population numbers generally stable to increasing, with the exception of the badger, which is experiencing a statewide population decline[2,4]
Raptors	Good[1,4]	Populations likely stable.
Migratory Birds	Good[1,4]	Populations likely stable.
Amphibians	Good[1,4]	Populations likely stable.
Reptiles	Good[1,4]	Populations likely stable.
Invertebrates	Good[1,4]	Populations likely stable.

Notes:
[1] Vegetation resource condition.
[2] Development/density of intrusions.
[3] Competition with other resources.
[4] As reflected by population levels.

3.6 Biological Resources – Special Status Species

3.6.1 Introduction

Special status species are those species federally listed as threatened, endangered, proposed, or candidate, as well as BLM sensitive species, and State of California sensitive species. This section describes the special status species that occur or may occur within the BLM-administered lands within the Planning Area and the BLM management approach for these species. A brief discussion of each special status species is provided in Section 3.6.5 and Tables 3.6-1 through 3.6-8, which have been organized by plants, fish, invertebrates, amphibians, reptiles, birds, and mammals.

3.6.2 Regulatory Framework

The regulatory framework relating to special status species under the management of the BLM includes the Endangered Species Act (ESA) of 1973; California Endangered Species Act of 1984 (CESA); and California Fish and Game Code § 2050-2116.

3.6.3 Regional Setting

Coastal Central California has a disproportionately high percentage of sensitive species compared to other regions in the United States. The complex tectonic and geologic history of the region historically fostered high levels of biodiversity at the landscape scale, while the booming development of the region following European colonization in the 19th and 20th centuries caused vast regions of wholesale habitat conversion to agricultural and urban uses. Some listed species such as the California red-legged frog (*Rana draytonii*) and California tiger salamander (*Ambystoma californiense*) once had a widespread regional distribution in California and are still present over a large area in the Coast Ranges. Other species are adapted to, and dependent upon, isolated and unusual habitat types such as inland dunes or serpentine soils, and therefore show a high level of local endemism. Examples of local endemics include the flightless Ciervo aegialian scarab beetle (*Aegialia concinna*) that lives in isolated sand dunes in the Ciervo Hills and San Benito evening primrose (*Camissonia benitensis*), which is locally endemic to serpentine soils of the Clear Creek Management Area. The inner Coast Ranges provide habitat for floral and faunal assemblages representative of the Central Valley and the outer Coast Range as well as forms unique to the ranges themselves. The San Joaquin Valley to the east of the CCMA historically sustained a California perennial grassland ecosystem with endemic plant species such as San Joaquin woolythreads (*Monolopia congdonii*), California jewelflower (*Caulanthus californicus*) and animal species such as San Joaquin kit fox (*Vulpes macrotis mutica*), numerous species of kangaroo rat (*Dipodomys* sp.), and blunt nosed leopard lizard (*Gambelia silus*). Following intensive agricultural conversion, virtually all of these endemic species suffered precipitous declines and many, if not most of them, are now listed or proposed for listing under the Federal Endangered Species Act. Coastally, numerous ESUs of anadromous salmonids, as well as several species of marine mammals and birds and endemic coastal dune plants and animals, have become listed at the state or Federal levels, or both.

3.6.4 Current Conditions and Trends

The BLM has completed or is in the process of identifying areas of ecological importance, designating priority species and habitats, and identifying restoration strategies, opportunities, and management decisions to protect or prevent avoidable loss of habitat supporting special status species within each of the management areas. In addition, consultation with the USFWS and NOAA Fisheries is required by the Endangered Species Act for Federal actions that may affect listed species and designated critical habitat.

The consultation process ensures that actions taken are not likely to jeopardize the continued existence of any threatened or endangered species or their critical habitat.

BLM has expended considerable effort in species-directed inventories throughout the State, particularly as part of efforts to conserve listed animals and plants in the San Joaquin Valley bioregion, of which the HFO is a major land holder. Map 4 in Appendix I shows all known special status species locations within the CCMA administered BLM GIS databases and the California Natural Diversity Database (CNDDB).

3.6.5 Special Status Species within the Planning Area

Special status species known to occur on the BLM-administered lands within CCMA and listed under the ESA or the CESA or otherwise identified by BLM as a special status species are enumerated in Tables 3.6-2 through 3.6-9 below. Map 4 (Appendix I) illustrates known or potential occurrences of special status species in the CCMA.

The CCMA has a relatively high percentage of rare species relative to surrounding areas due to its diversity of habitats. The CCMA contains both serpentine and nonserpentine-derived soils and an elevation range of 1,830 to 5,241 feet with rugged topography. The combination of drastically different soil types, elevational range, and topography (slope, aspect) support a variety of different vegetation types that include conifer forest, chaparral, grasslands, riparian areas, and even stark serpentine barrens which are completely devoid of vegetation. Due to the stressful physical and chemical conditions imposed by serpentine soils, the New Idria serpentine mass supports a high proportion of rare, edaphic endemic plant species. Despite its unique floral communities and its proximity to regions occupied by entire suites of Federally protected species, CCMA is known to harbor only one Federally-listed species, the San Benito evening primrose (*Camissonia benitensis*).

Other Federally listed species potentially present within the CCMA include the California condor (*Gymnogyps californicus*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) and San Joaquin kit fox (*Vulpes macrotis mutica*). The paucity of potential habitat for Tipton kangaroo rat and San Joaquin kit fox make their presence within the CCMA unlikely. The longstanding presence of Hernandez Dam on the San Benito River downstream from the CCMA precludes the current presence of anadromous fish, including federally-listed Coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*). Moreover, there are no historical records of those species in the CCMA. California red-legged frogs (*Rana draytonii*), while present in the San Benito River watershed fifteen miles or more downstream, have never been recorded in or near the CCMA. California tiger salamanders are present in sag pond habitat in the San Andreas Rift Zone to the west and in vernal pool habitat in the Central Valley to the east but have never been recorded in the environs of CCMA. Moreover, neither California red-legged frog nor California tiger salamander are expected anywhere within the planning area due to intrinsic habitat constraints. The planning area is mostly over 4,000 feet in altitude with a range from 1,800 to over 5,000 feet and is wholly composed of steep mountainous terrain with rocky, swift moving creeks. Several alpine ponds exist, but these have no emergent vegetation and are ephemeral, and have been thoroughly investigated for amphibians by trained herpetologists for decades, with only Pacific chorus frogs ever having been documented.

The unique vegetation types of the New Idria serpentine mass including serpentine chaparral and the San Benito Mountain conifer forest provide habitat for several sensitive bird species. The bald eagle was delisted on June 28, 2007. Although no longer protected under the ESA, new regulations were written for the Bald and Golden Eagle Protection Act of 1940 to include a prohibition against "disturb," which they defined as: "agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment."

3.6.5.1 Plants and Habitats

Special status plants occurring within the Planning Area are shown in in Table 3.6-2. The New Idria mass (Serpentine ACEC) within the CCMA harbors a large number of rare serpentine endemic plant species.

Special Status Plant Species

San Benito Evening primrose (*Camissonia benitensis*)

Family Onagraceae. Federally-listed Threatened. The US Fish and Wildlife Service proposed to list the San Benito evening-primrose as an endangered species on October 31, 1983 (48 FR 50126) based on impacts to the species and its habitat from OHV activity. The USFWS designated the species as a threatened, rather than endangered, species on February 12, 1985 (50 FR 5758). San Benito evening primrose is a diminuitive annual with wiry, greenish-purple stems, clusters of linear, pubescent leaves, and yellow four-petaled flowers (Figure 1). The species is a narrow (localized distribution), strict serpentine endemic (Safford *et al*. 2005). Most populations are located upon or with close proximity to the New Idria serpentine mass and associated serpentine landslides. Populations of the species are also known to occur on serpentine masses and outcrops within 11 airline miles east, southeast, and south of the edge of the New Idria serpentine mass. The furthest most known population of the species is located approximately 11 airline miles southeast of the New Idria serpentine mass on serpentine near HWY 198 between Mustang Ridge and Priest Valley. It is believed that the species may occur at an even greater radius (up to 20 miles) with a likely maximum range limit as far south as Priest Valley (Monterey county) and as far north as Panoche Valley (San Benito county), encompassing southern San Benito, western Fresno, and eastern Monterey counties. An estimated 70% of the total serpentine area within that range has been surveyed for the species to date.

A detailed description of the species and its ecology may be found in a report by Taylor (1990). Until spring 2010, it was believed that most San Benito evening primrose occupied and potential habitat consisted of relatively level serpentine alluvial fans and terraces (Figure 2) often adjacent to perennial streams within the Serpentine ACEC. It is now known that the species also grow in uplands on serpentine soil at geologic boundaries between serpentine and nonserpentine rock types where vegetation type transitions from serpentine chaparral to blue oak (*Quercus douglasii*) and California juniper (*Juniperus californica*) woodland (Figure 3). The species frequently occurs on the margins of the serpentine chaparral, where invasive annual grassland density is low and native herbaceous plant diversity is high. Although slope angle does not appear to be a major factor in where the species occurs, soil physcial properties are important. The species most commonly occus in the upland geologic transition zone habitat where the serpentine soil is friable (soft) when dry (loam – sandy loam texture). Virtually no populations of the the species have been found where soils are hard or develop large, deep cracks when dry (indicative of clayey soil texture). The geologic transition zone habitat type may in fact represent the majority of the habitat for the species with serpentine stream terraces being a rarer habitat type. Other minor habitat types found for the species include hard, fractured, serpentine rock outcrop (two known suboccurrences) near the geologic transition zone and hard, fractured nutrient-poor shale outcrops (four known suboccurrences) or shale barrens (one known suboccurrence) near the geologic transition zone. Overall, the habitat types found for the species suggest that the most important habitat characteristics for the species are:

- Serpentine substrate.
- Friable loam – sandy loam soil texture.
- Sparse woody overstory cover (abundant gaps). Sparse herbaceous understory cover.
- Stable habitat. Relatively low levels of erosion.

Specific habitat types include the following:

- Major: Serpentine-nonserpentine geologic transition zones (serpentine riparian and upland)
- Major: Serpentine alluvial stream terraces (serpentine riparian; nonserpentine riparian – serpentine alluvium outside of the Serpentine ACEC)
- Minor/anomalous: Serpentine rock outcrop (serpentine upland)
- Minor/anomalous: Shale outcrop/shale barrens (nonserpentine upland)

Prior to spring 2010, there were 63 known populations (suboccurrences) of San Benito evening primrose. Following the discovery of the geologic transition zone habitat and subsequent intensive survey of that habitat type, there are now approximately 231 know populations of the species. Table 3.6-1 shows the distribution of the populations found with respect to the CCMA and habitat type.

Table 3.6-1. Distribution of San Benito evening primrose populations inside and outside of the Serpentine ACEC and the CCMA

Location ↓ Land ownership →	BLM (Public)	Private	TOTAL
CCMA; Inside Serpentine ACEC	87	15	102
CCMA; Outside Serpentine ACEC	53	4	57
Outside CCMA	10	62	72

Habitat type ↓ Land ownership →	BLM (Public)	Private	TOTAL
Geologic transition zone	81	73	154
Serpentine stream terrace	63	7	70
Serpentine rock outcrop	2	0	2
Shale outcrop/barren	4	1	5

Most of the geologic transition zone occupied and potential habitat, being either outside of the core OHV use area or being located entirely outside of the CCMA, has experienced little to no impacts from OHV or other human-related activities such as livestock grazing. In comparison, most of the occupied and potential habitat of San Benito evening primrose on stream terraces has a long history of impacts from human activities, including road construction, logging, mining, and OHV use. Many routes, such as R1, R11, R15, and T158 were established on San Benito evening primrose habitat. The relatively level terraces have also been favored as staging areas for logging, mining, and more recently, for OHV use activities. Habitat disturbance has promoted the invasion of noxious species such as yellow starthistle (*Centaurea solstitialis*) into San Benito evening primrose habitat just outside of the Serpentine ACEC. Red brome (*Bromus madritensis*) has invaded some San Benito evening primrose habitat within the ACEC, but it is sparse and does not appear to be adversely impacting San Benito evening primrose. Invasive species are controlled through Integrated Pest Management. Most of the occupied and potential San Benito evening primrose habiat within the core OHV use area is now closed to OHV use and protected by fences and barricades.

Figure 1. San Benito evening primrose.

Figure 2. San Benito evening primrose serpentine stream terrace habitat (suboccurrence 51200) within the New Idria serpentine mass (Serpentine ACEC). Low density serpentine chaparral.

Figure 3. San Benito evening primrose geologic transition zone habitat on the edge of the New Idria serpentine mass (Serpentine ACEC). Low density blue oak and California juniper woodland.

Rayless layia (*Layia discoidea*)

Family Asteraceae, BLM Sensitive, CNPS 1B. Tiny annual with a basal rosette of leaves and small, bright yellow aster flowers on a wiry infloresence. Like San Benito evening primrose, rayless layia is a narrow serpentine endemic. Its habitat consists primarily of serpentine outcrops and scree on the New Idria and nearby Laguna Mountain and Hepsedam Peak serpentine masses (San Benito county). It occasionally co-occurs with San Benito evening primrose on serpentine stream terraces. Fencing of occupied and potential habitat for the San Benito evening primrose has afforded the rayless layia some protection. Most of the rayless layia occupied and potential habitat, however, is not physically protected. At least thirty populations are known to occur within the Serpentine ACEC. Two populations are known to occur outside of the Serpentine ACEC, one on serpentine landslide and one on shale outcrop. Numerous other populations are also know to occur on serpentine at Laguna Mountain outside of the CCMA. The largest known population of the species (>10,000 plants) occurs on serpentine at Hepsedam Peak outside of the CCMA.

San Benito fritillary *(Fritillaria viridea)*

Family Liliaceae, BLM Sensitive, CNPS 1B. Perennial lily with whorled leaves on a lanky infloresence, bearing nodding, small yellowish-green flowers. San Benito fritillary is a serpentine endemic with a southern Coast Range distribution in San Benito, Monterey, and San Luis Obispo counties. It primarily grows as scattered individuals in the understory beneath serpentine chaparral. San Benito fritillary is sparse, but widespread within the Serpentine ACEC of the CCMA.

Talus fritillary (*Fritillaria falcata*)

Family Liliaceae, BLM Sensitve, CNPS 1B. Perennial lily with a basal rosette of leaves and erect, yellow flower with brown speckles. Talus fritillary is a serpentine endemic restricted to the northern part of the

southern Coast Range in San Benito, Monterey, Santa Cruz, and Stanislaus counties. It grows on serpentine barrens and scree. Only nine populations in total are known with average population size being less than 100 individuals. Two populations are located within the Serpentine ACEC of the CCMA. One of the populations contains several hundred individuals and is the largest population of the species. This population is protected by an exclosure fence.

Mariposa cryptantha (*Cryptantha mariposae*)

Family Boraginaceae, BLM Sensitive, CNPS 1B. Small annual bristly herb with small white flowers borne on curled infloresences. Mariposa cryptantha is a serpentine endemic found at a few locations on serpentine in Stanislaus, Calaveras, Tuolumne, and Mariposa counties, as well as San Benito county within the Serpentine ACEC of the CCMA. The species grows as an understory species in serpentine chaparral. Mariposa cryptantha is very uncommon within the Serpentine ACEC of the CCMA.

Mt. Diablo phacelia (*Phacelia phacelioides*)

Family Hydrophyllaceae, BLM Sensitive, CNPS 1B. Perennial plant with basal rosette of bristly leaves and small light purple flowers borne on curled infloresences. Mt. Diablo phacelia is distributed throughout the south Coast Range in Contra Costa, Santa Clara, Stanislaus, Monterey, San Benito, and Kern counties. Although it often grows on serpentine soils as a chaparral understory species, it occasionally grows on nonserpentine soils as well. Mt. Diablo phacelia is very uncommon within the Serpentine ACEC of the CCMA.

Chaparral harebell (*Campanula exigua*)

Family Campanulaceae, BLM Sensitive, CNPS 1B. Annual herb with small, light purple, five-petaled flowers. Chaparral harebell is found in Contra Costa, Alameda, Santa Clara, Stanislaus, and San Benito counties. Othough it most often grows on serpentine soils as a chaparral understory species, it occasionally grows on nonserpentine soils as well. Chaparral harebell is very uncommon within the Serpentine ACEC of the CCMA.

Santa Cruz Mountains pussypaws (*Calyptridium parryi* var. *hesseae*)

Family Polygonaceae, BLM Sensitive, CNPS 1B. Rosetted annual herb with prostrate, compact pink flowers. Santa Cruz Mountains pussypaws occurs in Santa Clara, Santa Cruz, Montery, Fresno, and San Benito counties. Although the species is often found on nonserpentine soils, within the Serpentine ACEC of the CCMA, the species is only associated with serpentine vernal pools north of Clear Creek and at Spanish Lake. Most populations of the species within the CCMA are protected by exclusion fences. Santa Cruz Mountains pussypaws is locally abundant around the serpentine vernal pools, but very uncommon within the Serpentine ACEC of the CCMA as a whole.

San Benito spineflower (*Chorizanthe biloba* var. *immemora*)

Family Polygonaceae, BLM Sensitve, CNPS 1B. Small, annual prostrate plant with spiny reddish-purple leaves and tiny light purple flowers. San Benito spineflower is a very rare species known from only San Benito and Monterey counties. The species grows on nonserpentine sandy soils in valleys. The single known population located outside of the Serpentine ACEC and within the CCMA is protected by an exclusion fence.

Slender pentachaeta (*Pentachaeta exilis* ssp. *aeolica*)

Family Asteraceae, BLM Sensitve, CNPS 1B. Tiny annual with yellow aster flowers. Slender pentachaeta is also a very rare species known from only San Benito and Monterey counties. The species grows on nonserpentine clay soils in valleys. The single large population located outside of the Serpentine ACEC (same area as San Benito spineflower) and within the CCMA, is protected by an exclusion fence.

Indian Valley bush mallow (*Malacothamnus oboriginum*)

Family Malvaceae, BLM Sensitive, CNPS 1B. Small perennial shrub with light pink hibiscus-like flowers. Indian Valley bush mallow is an infrequent species that is distributed throughout the south Coast Range in San Mateo, Santa Clara, Monterey, Kings, Fresno, and San Benito counties. The species typically grows on rocky, nonserpentine soils. It responds favorably to fire and can appear in great numbers within burned areas. A few populations of Indian Valley bush mallow have been documented outside of the Serpentine ACEC within the CCMA.

Pale yellow layia (*Layia heterotricha*)

Family Asteraceae, BLM Sensitive, CNPS 1B. Small annual with light yellow aster flowers. Pale yellow layia is distributed throughout the south Coast Range in Monterey, San Benito, Fresno, Kings, San Luis Obispo, Kern, Santa Barbara, Ventura, and Los Angeles counties. It grows on sandy nonserpentine soils in uplands. A few populations of pale yellow layia have been documented on nonserpentine soils outside of the Serpentine ACEC in the southeast portion of the CCMA.

Showy madia (*Madia radiata*)

Family Asteraceae, BLM Sensitive, CNPS 1B. Small, aromatic annual with sticky foliage and small, bright yellow aster flowers. Showy madia is distributed throughout the south Coast Range in Contra Costa, San Joaquin, Santa Clara, San Benito, Fresno, Monterey, Kings, San Luis Obispo, Kern, and Santa Barbara counties. Like pale yellow layia, it also grows on sandy nonserpentine soils in uplands. Showy madia has been documented on nonserpentine soils outside of the Serpentine ACEC in the southern portion of the CCMA.

Table 3.6-2 Special Status Plants and Habitats Occurring within the Planning Area.
Species with affinity for serpentine soils (Serpentine ACEC). Species with affinity for nonserpentine soils (outside of ACEC). CNPS 1B = Rare, threatened, or endangered in California and elsewhere.
[1]Serpentine endemic status according to Safford *et al*. 2005.

Common Name	Scientific Name	Status	Serpentine endemic status[1]	Habitat type	Vegetation community
San Benito evening primrose	*Camissonia benitensis*	Federally-listed Threatened	Strict endemic	Serpentine riparian and upland	Mixed willow, leather oak
Rayless layia	*Layia discoidea*	BLM Sensitive Species, CNPS 1B	Strict endemic	Serpentine upland	Coulter pine, leather oak, serpentine barrens
San Benito fritillary	*Fritillaria viridea*	BLM Sensitive Species, CNPS 1B	Strict endemic	Serpentine upland	Coulter pine, leather oak
Talus fritillary	*Fritillaria falcata*	BLM Sensitive Species, CNPS 1B	Strict endemic	Serpentine upland	Coulter pine, leather oak, serpentine barrens
Mariposa cryptantha	*Cryptantha mariposae*	BLM Sensitive Species, CNPS 1B	Strict endemic	Serpentine upland	Coulter pine, leather oak, serpentine barrens
Mt. Diablo phacelia	*Phacelia phacelioides*	BLM Sensitive Species, CNPS 1B	Broad endemic or indicator	Serpentine upland	Coulter pine, leather oak
Chaparral harebell	*Campanula exigua*	BLM Sensitive Species, CNPS 1B	Broad endemic or indicator	Serpentine upland	Coulter pine, leather oak
Santa Cruz Mountains	*Calyptridium paryi* var. *hesseae*	BLM Sensitive Species, CNPS 1B	No status	Serpentine riparian and	Mixed willow, leather oak
San Benito spineflower	*Chorizanthe biloba* var. *immemora*	BLM Sensitive Species, CNPS 1B	No status	Nonserpentine upland	California annual grassland, blue oak
Slender pentachaeta	*Pentachaeta exilis* ssp. *aeolica*	BLM Sensitive Species, CNPS 1B	No status	Nonserpentine upland	California annual grassland, blue oak
Indian Valley bush mallow	*Malacothamnus aboriginum*	BLM Sensitive Species, CNPS 1B	No status	Nonserpentine upland	California annual grassland, chamise-wedgeleaf ceanothus, blue oak
Pale yellow layia	*Layia heterotrichia*	BLM Sensitive Species, CNPS 1B	No status	Nonserpentine upland	California annual grassland
Showy madia	*Madia radiata*	BLM Sensitive Species, CNPS 1B	No status	Nonserpentine upland	California annual grassland

Other Plant Species of Concern

Other plant species of concern occurring within the Planning Area are shown in Table 3.6-3.

Guirado's goldenrod (*Solidago guiradonis*)

Family Asteraceae, CNPS 4. Perennial with basal rosette and lanky infloresence with dense clusters of bright yellow aster flowers. Guirado's goldenrod is a serpentine endemic with distribution in the south Coast Range limited to San Benito and San Luis Obispo counties. Its habitat consists of moist serpentine stream terraces and seeps. Guirado's goldenrod is very common in all riparian areas within the Serpentine ACEC of the CCMA.

Serpentine leptosiphon (*Leptosiphon ambiguus*)

Family Polemoniaceae, CNPS 4. Small annual with pink phlox-like flowers. Serpentine leptosiphon is a serpentine endemic that has a widespread distribution throughout the south Coast Range in Contra Costa, Alameda, Santa Clara, San Mateo, Santa Cruz, Stanislaus, Merced, San Benito, Monterey, Fresno, and San Luis Obispo counties. Its habitat is primarily serpentine streamside terraces. Serpentine leptosiphon is uncommon within the Serpentine ACEC of the CCMA.

San Benito monardella (*Monardella antonina* ssp. *benitensis*)

Family Lamiaceae, CNPS 4. Small, aromatic (minty), perennial herb with purple flowers. San Benito monardella is a serpentine endemic with a very limited distribution in Monterey and San Benito counties. It's habitat includes serpentine soils of both stream terraces and uplands. San Benito monardella is common in all riparian areas (serpentine stream terraces) within the Serpentine ACEC of the CCMA.

Hernandez bluecurls (*Trichostema rubisepalum*)

Family Lamiaceae, CNPS 4. Small, aromatic, annual with sticky foliage and purple flowers. Hernandez bluecurls is a serpentine endemic found only in San Benito county (New Idria, Laguna Mountain and Hepsedam serpentine masses) in the south Coast Range. It is also found on serpentine in Calaveras, Tuolumne, Mariposa, and Trinity counties. It's habitat is limited to moist serpentine stream terraces and seeps. Hernandez bluecurls is common in all riparian areas within the Serpentine ACEC of the CCMA.

Carlotta Hall's lace fern (*Aspidotis carlotta-halliae*)

Family Pteridaceae, CNPS 4. Small fern. Carlotta Hall's lace fern is a serpentine endemic with a south Coast Range distribution in Marin, Alameda, Santa Clara, San Benito, Monterey, and San Benito counties. Its habitat consists of serpentine rock outcrops and scree. Carlotta Hall's lace fern is very uncommon within the Serpentine ACEC of the CCMA.

South Coast Range morning glory (*Calystegia collina* ssp. *venusta*)

Family Convolvulaceae, CNPS 4. Small, perennial herb with a basal rosette of leaves and a white morning glory-like flower. South Coast Range. South Coast Range morning glory is a serpentine endemic distributed throughout the south Coast Range in Monterey, San Benito, Fresno, San Luis Obispo, and Santa Barbara counties. It's habitat includes serpentine soils of both stream terraces and uplands. South Coast Range morning glory is very uncommon within the Serpentine ACEC of the CCMA.

Andrew's bedstraw (*Galium andrewsii* ssp. *gatense*)

Family Rubiaceae, CNPS 4. Small, compact, herbaceous perennial with tiny spiny leaves. Andrew's bedstraw is a serpentine endemic distributed throughout the south Coast Range in Contra Costa, Alameda, Santa Clara, Stanislaus,Santa Cruz, Monterey, San Benito, Fresno, and San Luis Obispo counties. It grows on serpentine soils in uplands. Andrew's bedstraw is sparse, but widespread within the Serpentine ACEC of the CCMA.

Benitoa (*Benitoa occidentalis*)

Family Asteraceae, CNPS 4. Small, bushy annual with sticky foliage and bright yellow aster flowers. Benitoa has a limited distribution in the south Coast Range in Monterey, San Benito, and Fresno counties. Although it often grows on serpentine soils, it occasionally grows on nonserpentine soils as well. Benitoa is very uncommmon in the CCMA. The only documented population of the species near the CCMA (and San Benito county) is ½ mile west of New Idria (just outside of the CCMA).

San Benito thorn mint (*Acanthomintha obovata* ssp. *obovata*)

Family Lamiaceae, CNPS 4. Small, aromatic, spiny annual with white, snapdragon-like flowers. San Benito thornmint has a limited distribution in the south Coast Range in Monterey, San Benito, Fresno, and Ventura counties. Although it often grows on serpentine outcrops, it occasionally grows on nonserpentine rock outcrops as well. A few populations of San Benito thornmint have been documented both within and outside of the Serpentine ACEC of the CCMA.

Brewer's clarkia (*Clarkia breweri*)

Family Onagraceae, CNPS 4. Small annual with pink four-petaled flowers. Brewer's clarkia is distributed throughout the south Coast Range in Alameda, Santa Clara, Stanislaus, Merced, San Benito, Monterey, and Fresno counties. Although it often grows on serpentine outcrops and scree, it occasionally grows on nonserpentine rock outcrops as well. Brewer's clarkia is very uncommon within the Serpentine ACEC of the CCMA.

Sulphur flower buckwheat (*Eriogonum umbellatum* var. *bahiiforme*)

Family Polygonaceae, CNPS 4. Small prostrate subshrub with compact, pink clusters of flowers. Sulphur flower buckwheat is a common, widespread species throughout California. Variety *bahiiforme* has a limited distribution in California, primarily found in the north and south Coast Range. The variety is found as commonly on serpentine soils as nonserpentine soils throughout that range. Within the CCMA, the species is only found on serpentine soils within the Serpentine ACEC. Sulphur flower buckwheat is uncommon within the Serpentine ACEC of the CCMA.

Western Heerman's buckwheat (*Eriogonum heermannii* var. *occidentale*)

Family Polygonaceae, CNPS 4. Small woody shrub with clusters of tiny white flowers. Western Heerman's buckwheat is a very rare species distributed in the northern portion of the south Coast Range in Monterey, San Benito, and Fresno counties. Its habitat consists of sandy, alluvial soils. In the CCMA, it grows outside of the ACEC on serpentine alluvium near the confluence of Clear Creek and San Benito River. The population is protected by an exclosure fence.

One-sided monkeyflower (*Mimulus fremontii*)

Family Phrymaceae (Scrophulariaceae), CNPS 4. Small annual with purple shapdragon-like flowers. One-sided monkeyflower has a widespread distribution throughout the southern portion of the south Coast Range and into the Transverse and Peninsular Ranges and beyond into the Mojave desert. In the south Coast Range, it is found in San Benito, Monterey, San Luis Obispo, Kern, and Santa Barbara counties. Its habitat is primarily serpentine stream terraces within the ACEC of the CCMA, but it also frequently grows on nonserpentine soils as well. One-sided monkeyflower is common within the Serpentine ACEC of the CCMA.

Santa Clara thorn mint (*Acanthomintha lanceolata*)

Family Lamiaceae, CNPS 4. Small, aromatic, spiny annual with white, snapdragon-like flowers. Santa Clara thorn mint is distributed throughout the south Coast Range in Alameda, San Joaquin, Santa Clara, Stanislaus, Merced, San Benito, Monterey, and Fresno counties. Although it often grows on serpentine outcrops, it occasionally grows on nonserpentine rock outcrops as well. A few populations of San Benito thorn mint have been documented both within and outside of the Serpentine ACEC of the CCMA.

Protruding buckwheat (*Eriogonum nudum* var. *indictum*)

Family Polygonaceae, CNPS 4. Herbaceous perennial with a basal rosette of leaves and inflated infloresence stems bearing light pink flowers. Protruding buckwheat has a widespread distribution throughout the south Coast Range in Stanislaus, Merced, Monterey, San Benito, Fresno, San Luis Obispo, Kern, and Santa Barbara counties. Its habitat consists of sandstone rock and shale outcrops. Protruding buckwheat occurs primarily on the north and east sides of the CCMA outside of the Serpentine ACEC.

Oval leaved snapdragon (*Antirrhinum ovatum*)

Family Scrophulariaceae, CNPS 4. Annual herb with light pink, snapdragon-like flowers. Oval leaved snapdragon is a rare species found in the south Coast Range in San Benito, Monterey, San Luis Obispo, Kern, Santa Barbara, and Ventura counties. It grows primarily on sandy soils. Oval leaved snapdragon occurs just outside the eastern border of the CCMA with potential to occur within the CCMA.

Stinkbells (*Fritillaria agrestis*)

Family Liliaceae, CNPS 4. Perennial lily with a basal rosette of fleshy leaves, lanky infloresence, and nodding, dull yellow or red flower. Stinkbells has a widespread distribution in northern and central California. In the south Coast Range, it occurrs in Contra Costa, Alameda, San Mateo, Stanislaus, Monterey, San Benito, Fresno, San Luis Obispo, and Kern counties. Its habitat includes clay soils (occasionally serpentine-derived) in grasslands. Stinkbells occurs within the CCMA outside of the Serpentine ACEC.

Salinas milkvetch (*Astragalus macrodon*)

Family Fabaceae, CNPS 4. Perrenial herb with dissected leaves, forming a small shrub. Bears clusters of light yellow flowers. Salinas milkvetch is found in the south Coast Range in San Benito, Monterey, San Luis Obispo, Kern, and Santa Barbara counties. Its habitat consists primarily of sandy or gravelly substrates, especially alluvium. Salinas milkvetch occurs just outside the eastern border of the CCMA with potential to occur within the CCMA.

Table 3.6-3 Other Plant Species of Concern and Habitats Occurring within the Planning Area. Species with affinity for serpentine soils (ACEC). CNPS 4 = Limited distribution (watch list).
[1]Serpentine endemic status according to Safford *et al*. 2005.

Common Name	Scientific Name	Status	Serpentine endemic status[1]	Habitat type	Vegetation community
Guirado's	*Solidago guira-*	CNPS 4	Strict endemic	Serpentine	Mixed willow
Serpentine leptosiphon	*Leptosiphon ambiguus*	CNPS 4	Strict endemic	Serpentine riparian and upland	Leather oak, mixed willow
San Benito monardella	*Monardella antonina* ssp. *benitensis*	CNPS 4	Strict endemic	Serpentine riparian and upland	Leather oak, mixed willow
Hernandez bluecurls	*Trichostema rubisepalum*	CNPS 4	Broad endemic	Serpentine riparian	Leather oak, mixed willow
Carlotta Hall's lace fern	*Aspidotis carlotta-halliae*	CNPS 4	Broad endemic	Serpentine upland	Leather oak, serpentine barrens
South Coast Range morning glory	*Calystegia collina* ssp. *venusta*	CNPS 4	Broad endemic	Serpentine upland	Leather oak, mixed willow
Andrew's bedstraw	*Galium andrewsii* ssp. *gatense*	CNPS 4	Broad endemic	Serpentine upland	Coulter pine, leather oak
Benitoa	*Benitoa occidentalis*	CNPS 4	Broad endemic	Serpentine upland	Leather oak
San Benito thorn mint	*Acanthomintha obovata* ssp. *obovata*	CNPS 4	Broad endemic or indicator	Serpentine upland	Leather oak, serpentine barrens
Brewer's clarkia	*Clarkia breweri*	CNPS 4	Broad endemic or indicator	Serpentine upland	Leather oak, serpentine barrens
Sulphur flower buckwheat	*Eriogonum umbellatum* var. *bahiiforme*	CNPS 4	Broad endemic or indicator	Serpentine upland	Coulter pine, leather oak, serpentine barrens
Western Heerman's buckwheat	*Eriogonum heermannii* var. *occidentale*	CNPS 4	No status	Serpentine riparian	Mixed willow
One-sided monkeyflower	*Mimulus fremontii*	CNPS 4	No status	Serpentine riparian and upland	Leather oak, mixed willow
Santa Clara thorn mint	*Acanthomintha lanceolata*	CNPS 4	No status	Serpentine upland	Leather oak, serpentine barrens

Table 3.6-3 Other Plant Species of Concern and Habitats Occurring within the Planning Area (cont.). Species with affinity for nonserpentine soils CNPS 4 = Limited distribution (watch list).
[1]Serpentine endemic status according to Safford *et al*. 2005.

Common Name	Scientific Name	Status	Serpentine endemic status[1]	Habitat type	Vegetation community
Protruding buckwheat	*Eriogonum nudum* var. *indictum*	CNPS 4	No status	Nonserpentine upland	Chamise-wedgeleaf ceanothus, California buckwheat
Oval leaved snapdragon	*Antirrhinum ovatum*	CNPS 4	No status	Nonserpentine upland	Chamise-wedgeleaf ceanothus, California
Stinkbells	*Fritillaria agrestis*	CNPS 4	No status	Nonserpentine upland	California annual grassland, Blue oak
Salinas milkvetch	*Astragalus macrodon*	CNPS 4	No status	Nonserpentine upland	Chamise-wedgeleaf ceanothus, California buckwheat

3.6.5.2 Fish

No federally listed fish species occur within the Planning Area. One California (fish) species of special concern may occur within the Planning Area, as presented in Table 3.6-4. The Monterey roach is thought to be in decline rangewide, partly through the action of dams, which may lead to increased competition from hitch (*Lavinia exilicauda*).

Table 3.6-4 Special Status Fish Occurring within the Planning Area

Common Name	Scientific Name	Status
Monterey roach	*Lavinia symmetricus subditus*	State species of special concern

3.6.5.3 Invertebrates

Two special status species of invertebrates may occur within the Planning Area, as presented in Table 3.6-5. Critical habitat has been designated for the longhorn fairy shrimp and vernal pool fairy shrimp (*Federal Register* 68:46683; August 6, 2003). A vernal pool species recovery plan titled "Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon" was issued by the U.S. Fish and Wildlife Service in 2008. The vernal pool fairy shrimp is federally listed as threatened. The longhorn fairy shrimp is federally listed as endangered. These crustaceans inhabit rain-filled ephemeral pools within the vernal pools that form in depressions in bedrock and meadows. Pools must fill frequently and persist long

enough for the species to complete its life cycle, which takes place entirely within vernal pools. Although neither species was found in a recent survey of CCMA vernal pools (Figure 4), their potential presence could not be ruled out, while two other sensitive crustaceans, the Conservancy fairy shrimp and the vernal pool tadpole shrimp, are considered unlikely to occur within the Planning Area (Hopkins and Silverman 2004).

Table 3.6-5 Special Status Invertebrates Occurring within the Planning Area

Common Name	Scientific Name	Status
Longhorn fairy shrimp	*Branchinecta longiantenna*	Federal endangered
Vernal pool fairy shrimp	*Branchinecta lynchi*	Federal threatened

Figure 4. Spanish Lake, a vernal pool underlain by serpentine within the CCMA. Potential habitat for fairy shrimp species.

3.6.5.4 Amphibians

One BLM sensitive amphibian species occurs within the Planning Area: the foothill yellow-legged frog. Table 3.6-6 lists the species, its status as a State species of special concern. Foothill yellow-legged frogs are locally abundant within the many streams of the CCMA (Figure 5), but its abundance is dependent on complex stream environments that allow them to choose optimal oviposition sites. Populations downstream from reservoirs are particularly susceptible to local extirpation due to non-natural pulsed flows. Siltation is also a potential problem because it can occlude the cobble-bottomed stream habitat frogs prefer. No other sensitive amphibians are known to occur or potentially occur in the planning area.

Table 3.6-6 Special Status Amphibians Occurring within the Planning Area

Common Name	Scientific Name	Status
Foothill yellow-legged frog	*Rana boylii*	BLM sensitive species, State species of special concern

Figure 5. Riparian zone on the New Idria serpentine mass (upper San Benito River) provides habitat for foothill yellow-legged frogs and two-striped garter snakes.

3.6.5.5 Reptiles

The four sensitive reptiles known to occur within the Planning Area are presented in Table 3.6-7. All four are protected by CDFG and cannot be handled without a scientific collecting permit. Threats to reptiles include direct mortality and habitat loss due to OHV activity, as well as predation from mesomammals such as raccoons (*Procyon lotor*) whose populations may be artificially increased by presence of garbage and hand feeding by the public. Coast horned lizards (*Phrynosoma coronatum frontale*) are at risk due to the replacement of native ant species by the inedible Argentine fire ant (*Linepithema humile*). California legless lizards (*Anniella pulchra*) are particularly vulnerable to disturbances that reduce shrubs and associated leaf litter from the sandy soils they inhabit. Two-striped garter snakes (*Thamnophis hammondii*) are comparatively robust but are dependent on healthy riparian systems with sustainable populations of fish. Southwestern pond turtles require pools and associated riparian structure and also needs undisturbed sandy uplands in which to bury eggs in late spring, and are at risk from vehicular traffic when moving from aquatic habitat to upland nesting sites.

Table 3.6-7 Special Status Reptiles Occurring within the Planning Area

Common Name	Scientific Name	Status
California horned lizard	*Phrynosoma blainvillii (=coronatum frontale)*	BLM sensitive species, SSSC[1]
California legless lizard	*Anniella pulchra*	SSSC[1]
Two-striped garter snake	*Thamnophis hammondii*	BLM sensitive species, SSSC[1]
Southwestern pond turtle	*Actinemys marmorata pallida*	BLM sensitive species, SSSC[1]

[1]California State Species of Special Concern

3.6.5.6 Birds

The sixteen avian species presented in Table 3.6-8 occur or have the potential to occur within the Planning Area; the planning area includes considerable habitat of value to raptors. Sensitive raptor species that utilize habitats provided in the Planning Area include the California condor, bald and golden eagle, Swainson's and sharp-shinned hawk, northern harrier, short-eared, long-eared, and burrowing owl, and prairie falcon. Threats to raptors include poisoning, vehicle collisions, habitat loss, illegal hunting, illegal trading and egg collecting, power lines and towers, falconry, a reduced prey base, and disturbance of nesting and roosting sites. California condors and bald eagles are expected to increase in frequency of sightings as their populations recover from historical declines.

Table 3.6-8 Special Status Avian Species Occurring or Potentially Occurring within the Planning Area

Common Name	Scientific Name	Status
California Condor	*Gymnogyps californicus*	Federal Endangered, State Endangered
Bald Eagle	*Haliaeetus leucocephalus*	FBEPA[3]
Swainson's Hawk	*Buteo swainsoni*	State-listed Threatened, BCC[1]
Golden Eagle	*Aquila chrysaetos*	PT[2], FBEPA[3],FP[4]
Northern Harrier	*Circus cyaneus*	SSSC[5], BSSC[5]
Prairie Falcon	*Falco mexicanus*	BCC[1]
Short-eared Owl	*Asio flammeus*	SSSC[5]
Long-eared Owl	*Asio otus*	SSSC[5]
Burrowing Owl	*Athene cunicularia*	BLM Sensitive Species, BCC[1], SSSC[5]
Olive-sided Flycatcher	*Contopus cooperi*	SSSC[5]
Loggerhead Shrike (mainland populations)	*Lanius ludovicianus*	SSSC[5]
Yellow-breasted chat	*Ichteria virens*	SSSC[5]
Grasshopper Sparrow	*Ammodramus savannarum*	SSSC[5]

[1]FWS Bird of Conservation Concern; [2]Proposed threatened; [3]Federal Bald Eagle Protection Act; [4]State Fully Protected Species; [5]California State Species of Special Concern.

The bald eagle was delisted on June 28, 2007. Although no longer protected under the ESA, new regulations were written for the Bald and Golden Eagle Protection Act of 1940 to include a prohibition against "disturb," which they defined as: "agitate or bother a bald or golden eagle to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment."

3.6.5.7 Mammals

Thirteen sensitive mammal species occur or have the potential to occur within the Planning Area, as listed in Table 3.6-9. Ringtail (*Bassariscus astutus*) have been anecdotally observed in the CCMA. Bats of one or more unidentified species are known to inhabit abandoned mine shafts, and bats also likely roost in conifers and rock outcrops. Big-eared kangaroo rats are associated with chaparral and have been collected on San Benito Mountain and in Sawmill Creek.

Table 3.6-9 Special Status Mammals Occurring or Potentially Occurring within the Planning Area

Common Name	Scientific Name	Status
Western mastiff-bat	*Eumops perotis californicus*	BLM Sensitive Species, SSSC[1]
Townsend's western big-eared bat	*Corynorhinus townsendi townsendi*	BLM Sensitive Species, SSSC[1]
Pallid bat	*Antrozus pallidus*	BLM Sensitive Species, SSSC[1]
Yuma myotis	*Myotis yumanensis*	BLM Sensitive Species
Long-eared myotis	*Myotis evotis*	BLM Sensitive Species
Fringed myotis	*Myotis thysanoides*	BLM Sensitive Species
Small-footed myotis	*Myotis ciliolabrum*	BLM Sensitive Species
Big-eared kangaroo rat	*Dipodomys venustus elephantinus*	SSSC[1]
Short-nosed kangaroo rat	*Dipodomys nitratoides brevinasus*	BLM Sensitive Species
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	Federal and State Endangered
San Joaquin pocket mouse	*Perognathus inornatus inornatus*	BLM Sensitive Species
San Joaquin kit fox	*Vulpes macrotis mutica*	Federal Endangered
American badger	*Taxidea taxus*	SSSC[1]
Ringtail	*Bassariscus astutus*	State Fully Protected Species

[1]California State Species of Special Concern

3.7 Air Quality

3.7.1 Introduction

As identified in the purpose and need (Section 1.1) for this RMP/EIS, the major air quality concern in the CCMA is the release of airborne asbestos emissions that pose a risk to human health and the environment when CCMA soils are disturbed from visitor use activities in the Serpentine ACEC. Six types of 'asbestos' are classified as a hazardous air pollutant under the Clean Air Act Amendments of 1990, Section 112(b), including chrysotile, which is the type of asbestos most commonly found in CCMA soils.

In order to evaluate overall protection of human health and the environment in this RMP/EIS, hazardous air pollutants and the human health risk from exposure to airborne asbestos emissions are addressed under "Hazardous Materials and Public Health and Safety" in Sections 2.4.2, 3.2, and 4.2. The remainder of the affected environment discussion for air quality is based on the total Vehicle Miles Traveled (VMT) by approximately 35,000 visitors/year in the 75,000-acre CCMA and is not directly related to the selection of a particular route network.

For the purpose of monitoring and regulating air quality, the state of California has been divided into 15 air basins based on meteorological and geographic similarities. Whenever practical, political boundary lines also affect the location of air basin boundaries. The two air basins encompassing CCMA are the North Central Coast and the San Joaquin Valley. There are two regional air quality boards that oversee these air basins: Monterey Bay Unified Air Pollution Control Board (MBUAPCD) and the San Joaquin Valley Unified Air Pollution Control Board (SJVUAPCD). The North Central Coast Air Basin (NCCAB) includes Monterey, Santa Cruz and San Benito Counties. A portion of western Fresno County is located in the CCMA is located in the SJVAB.

In addition to federal designations based on the National Ambient Air Quality Standards, the California Air Resources Board (CARB) has further designations based criteria established for nine pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter, sulfates, lead, hydrogen sulfide and visibility reducing particles.

Other air quality concerns in the air basins within the CCMA are ground-level ozone and particulate matter (PM10, PM2.5). The air pollutant concentrations of ozone and particulate matter recorded by monitoring stations in these air basins do not meet State of California ozone air quality standards. Ozone is not a directly emitted pollutant; it forms in the presence of sunlight from oxides of nitrogen (NO_x) and reactive organic gases (ROGs). Ambient air concentrations of particulate matter, measured as respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), also are found above Federal and State standards. Particulate matter is directly emitted to the atmosphere by travel on paved and unpaved roads and surfaces, from combustion of fuels, waste burning, and agricultural practices; it is also indirectly emitted from the reaction of gases that result in the formation of smog.

3.7.2 Regulatory Framework

Federal and State regulations protect ambient air quality include:

- **The Clean Air Act (CAA) of 1970**, 42 United States Code (USC) 7401 et seq., as amended in 1977 and 1990.
- **Code of Federal Regulations (CFR) Title 40**, Parts 50-99.
- **The Comprehensive Environmental Responsibility and Clean-Up Liability Act (CERCLA)**
- **National Emission Standards for Hazardous Air Pollutants (NESHAP)**

3.7.3 Regional Setting

Title I of the Clean Air Act (CAA), as amended, established National Ambient Air Quality Standards (NAAQS) for a variety of air pollutants. National "primary" standards represent thresholds for six "criteria" pollutants, which may result in known impacts on human health when they are exceeded. National "secondary" standards for these "criteria" pollutants define levels of air quality judged necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant, or to protect other resources.

The State of California has also established a set of ambient air quality standards to provide additional protection. In particular, the State of California has begun to implement a long-term program to identify, assess, and control ambient levels of hazardous air pollutants. This program was initiated by passage of the Air Toxics "Hot Spots" Information and Assessment Act of 1987. As the name implies, "hot spots" are localized point-source emissions of air toxics generated by both large and small industrial operations such as mining, oil and gas, manufacturing, and processing. This Act is in accordance with Title III of the CAA as amended in 1990. The CAA directs the U.S. Environmental Protection Agency (EPA) to establish National Emission Standards for Hazardous Air Pollutants (NESHAP) that set limits on emissions of especially harmful air pollutants. Air Toxic "hot spot" violations are monitored and regulated by the local Air Pollution Control Districts (APCDs). For example, NESHAPS applied to asbestos mines and mill sites, state that there can be no visible dust emissions from these operations.

PM_{10} in the atmosphere can be caused by both environmental factors and human activities. Human activities that contribute to PM_{10} emissions in CCMA include combustion sources, fugitive dust sources, and off-highway vehicle (OHV) travel on un-paved roads and barrens. The 2002 Estimated Annual Average Emissions (CARB) for San Benito County, indicate a total of 6.31 tons per day of PM_{10} emissions from unpaved road sources, however it is likely that these estimates do not account for emissions from the CCMA. The other pollutants associated with exhaust from motorized vehicles are: Reactive Organic Gases (ROG), Nitrogen Oxides (NOX), and Carbon Monoxide (CO). For Off-Road Recreational Vehicles (Other Mobile Sources), the 2002 Estimated Annual Average Emissions (CARB) for San Benito County, from these pollutants in tons per day is, ROG/0.03 and CO/0.34. Since the San Joaquin Valley Air Pollution Control Board adopted a PM_{10} reduction plan effective December 1993, all land-use decisions for the CCMA will need to conform to this plan.

The US EPA has established new NAAQ standard for $PM_{2.5}$ emissions. These fine particles have been implicated as an increased health risk. Sources for $PM_{2.5}$ emissions mostly consist of chemical compounds from combustion processes in vehicles. However, natural processes and human activities, such as motorized vehicle operation, easily erode serpentine rocks bearing asbestos (Wrucke 1995). Vehicle travel on unpaved serpentine roads and trails can also generate asbestos emissions and other fine dust of less than ten microns (PM_{10}), all of which can negatively impact air quality. The BLM's National Science and Technology Center (now known as the National Operations Center) prepared an Air Conformity Analysis and updated PM emission inventory for the CCMA based on soil type, silt loading, and vehicle type to analyze the impacts to air quality from the Proposed CCMA RMP Amendment and Final EIS for Route Designation (2005). This data quantifies the PM_{10} and $PM_{2.5}$ contribution from vehicles under current management (i.e. No Action Alternative) and is located in Appendix IX. The results of the 2005 Air Conformity Analysis determined that emissions associated with BLM's land use decisions and public vehicle use in the CCMA are below *de minimis* levels.

3.7.4 Current Conditions and Trends

3.7.4.1 Climate

In general, the summer climate of the West Coast is controlled by high pressure centered over the northeastern Pacific Ocean. The summer period is rarely stormy due to the high-pressure center. During this period, precipitation is negligible and winds are generally from the northwest. Air from the northwest, passing over cold, upwelling water off the coast frequently forms low clouds and/or fog along the coast. This generally tranquil weather period also is characterized by the presence of atmospheric temperature inversions, which tend to inhibit the dispersion of air pollutants and allow for high air pollution potential.

During winter, the high pressure over the northeastern Pacific Ocean generally weakens and moves southward, allowing storms to occur more frequently along the West Coast. The summertime atmospheric temperature inversions and cold, upwelling water off the coast disappear during the winter, and wind speeds tend to be higher; these factors generally result in low air pollution potential. However, during winter, on occasions when the Pacific high-pressure area strengthens, strong atmospheric temperature inversions can develop near the land surface and winds weaken, resulting in high air pollution potential.

Several climate subregions are within the Planning Area. These subregions are locations where local topography plays a significant role in modifying regional weather conditions along the West Coast. In the Central Coast regions, temperatures along the coast are milder, and there is less variation in day/night or seasonal temperatures than at inland locations (BAAQMD 2005). In the San Joaquin valley, the generally flat topography results in cool, wet winters and hot, dry summers (CARB 2005). Climate conditions within the North Central Coast Air Basin vary due to the rather mountainous topography found there; however, coastal areas have mild temperatures throughout the year (MBUAPCD 2004).

3.7.4.2 Air Basins

The western Fresno County portion of CCMA is in the San Joaquin Valley Air Basin, and the San Benito County portion of CCMA is in the North Central Coast Air Basin. Air quality within these air basins is managed by two Air Pollution Control Districts (APCDs) that are identified below. Ambient air pollutant concentration levels are monitored within each basin and summarized by the California Air Resources Board. The California Almanac of Emissions and Air Quality – 2005 Edition, was used to summarize current air quality conditions (CARB 2005).

San Joaquin Valley Air Basin

Air quality in this air basin is managed by the San Joaquin Valley Unified Air Pollution Control District (APCD). The San Joaquin valley is a relatively flat area at an elevation at or below 400 feet above sea level. Twenty-nine ambient air quality monitors are located throughout the air basin. Rather than being dominated by one or two large sources, emissions in this air basin originate primarily from several modestly sized urban areas spread along a roughly north-south axis in the valley.

Emissions of NO_x, ROG, and carbon monoxide (CO) have been trending downward since 1990; during this same period, emissions of PM_{10} and $PM_{2.5}$ have been increasing slightly. Controls on motor vehicle emissions are primarily responsible for these decreases, even though population and motor vehicle miles traveled in the air basin have increased between 1990 and 2005. Emissions of ROG also have decreased due to the implementation of stationary source controls on petroleum facilities in the air basin. The tons per day (on an annual average basis) of NO_x, ROG, and CO emissions have decreased as shown in Table 3.7-1. Emissions of PM_{10} and $PM_{2.5}$, also shown in Table 3.7-1, have remained steady and are primarily due to vehicle travel on paved and unpaved roads, agricultural activities, and waste burning.

Table 3.7-1 Emissions into the San Joaquin Valley Air Basin (in tons per day on an annual average basis)

Year	NO_x	ROG	PM_{10}	$PM_{2.5}$	CO
1990	811	642	351	149	3,336
2005	479	386	358	149	1,670
2015 (projected)	335	357	385	157	1,187

Source: CARB 2005

The San Joaquin Valley Air Basin currently exceeds both Federal and California ambient air quality standards for ozone. The air basin is designated as extreme nonattainment for ozone under the Federal 1-hour standard and severe nonattainment for ozone under the California 1-hour standard. It also is designated serious nonattainment for ozone under the Federal 8-hour standard (there is no California 8-hour ozone standard). Although the 1-hour peak ozone concentration has not declined significantly between 1990 and 2004, the number of days exceeding the 1-hour ozone standard has decreased by 55 percent, likely due to the decrease in NO_x, and ROG emissions. CARB has found that the air basin serves as both a source of ozone-forming compounds that are transported to other air basins, as well as a receiver of ozone-forming compounds and ozone from other air districts.

The air basin is designated as nonattainment for the Federal $PM_{2.5}$ standard and is in maintenance status for the PM10 standard. Although there is year-to-year variation, the general trend in ambient PM_{10} concentration is slightly downward during the period 1990 through 2003. However, the rate of decrease in PM_{10} levels was not sufficient to achieve compliance with the standard for several years. CARB does not provide trend information for ambient $PM_{2.5}$ due to the relatively short data set available; trends in $PM_{2.5}$ generally follow the same pattern as for PM_{10}.

Air quality has improved in the San Joaquin valley for CO and for ozone in terms of the number of days exceeding the 1-hour ozone standard. The prognosis for improvement of air quality in the San Joaquin Air Basin is moderate. As shown for the period 1990 through 2005, reductions in the emissions of ROG and NO_x reduced the number of 1-hour ozone exceedance days, although compliance with the standard has not yet been achieved. The CARB projects an approximately 10 percent decrease in ROGs and a 30 percent decrease in NO_x from 2005 to 2015, as shown in Table 3.7-1. Attainment of Federal air quality standards by 2015 for ozone is possible but remains uncertain.

Much progress has been made in lowering CO levels in the air basin. Measured CO concentrations in the air basin have not exceeded the Federal CO standards since 1991, nor have they exceeded State of California standards for the last eight years. The trend of decreasing ambient CO levels is expected to continue. As shown in Table 3.7-1, CARB anticipates CO emissions will decrease another 29 percent between 2005 and 2015 (CARB 2005).

North Central Coast Air Basin

Air quality in this air basin is managed by the Monterey Bay Unified Air Pollution Control District (MBUAPCD). The district operates 10 air quality monitors in the basin to collect data for determining compliance with Federal and State air quality standards. Air quality also is monitored by the National Park Service at Pinnacles National Monument. The basin is designated as attainment, with a maintenance plan, for the Federal 8-hour ozone standard, and as attainment/unclassifiable for all other Federal standards. The basin is designated nonattainment for the California ozone and PM_{10} standards.

This air basin was in violation of the State ozone standard for a total of 14 days in 1994 and 1995. Analysis of those violations revealed that on 11 days the violation was due to the transport of pollutants from other basins. On the remaining three days, the analysis was either inconclusive or revealed that the cause of the ozone exceedance was beyond regulatory control (e.g., weather related). Thus, this air basin is significantly affected by the air quality of the surrounding air basins, and less so by emissions from within the basin boundary (MBUAPCD 2004).

Emissions of NO_x and ROG in the North Central Coast Air Basin are shown in Table 3.7-2. These emission values are much lower than those for the San Francisco Bay Area or San Joaquin Valley air basins. By 2015, the mix of sources producing NO_x and ROG emissions is expected to shift away from being dominated by mobile sources. For example, emissions resulting from prescribed burning are expected to become a larger fraction of the total emissions, as are emissions from coatings/solvent use for ROG emissions and natural gas combustion for NO_x emissions.

Table 3.7-2 Emissions During the Ozone Season (May through September) into the North Central Coast Air Basin (in tons per day)

Year	NO_x	ROG
1990	135	114
2005 (projected)	84	76
2015 (projected)	62	69

Source: MBUAPCD 2004

Despite population in the North Central Coast Air Basin increasing by 44 percent by 2015, NO_x and ROG emissions are projected to decrease (MBUAPCD 2004).

The MBUAPCD has also adopted smoke management plans to control the emissions of NO_x, ROG, and particulate matter from various types of vegetation burning (MBUAPCD 2004). Prescribed burns and agricultural burning are conducted regularly in the air basin.

3.7.5 Climate Change

The Intergovernmental Panel on Climate Change reports that the southwestern United States is likely to become hotter and drier (Christensen et al. 2007). This prediction is the most current and thorough analysis of expected global climate change and is based on information from four potential sources: Atmosphere-Ocean General Circulation Model (AOGCM) simulations, downscaling of AOGCM-simulated data using techniques to enhance regional detail, physical understanding of the processes governing regional responses, and recent historical climate change. Analysis using a Regional Climate Model (RCM), shown to have good predictive value for California, also indicates that the CCMA is likely to be hotter and drier by the end of the 21st century (Kueppers et al. 2005). The RCM scenario was considered better than its AOGCM counterpart because the RCM had a much finer resolution and was based on local topography, distance from the coast, latitude, and other fine-scale attributes not available in an AOGCM. The California Energy Commission (2005), using older analyses, also predicted increased temperatures, but precipitation trends were unclear.

Drier conditions for the CCMA mean that, overall, there would be less vegetative growth by the end of the 21st century. Therefore, a change in vegetation zones is also expected, where oak woodlands would potentially trend towards scrublands, scrublands to grasslands, and grasslands to desert-like habitat with significant portions of bare soils or biological crusts. As the general area becomes drier, plant communities and animal guilds are expected to migrate northward or upward in elevation. Depending on

the strength and rapidity of the change, some elements of the flora may also disappear. As precipitation levels and recharge decline, some springs would dry up, while others would diminish in flow.

The amount and persistence of vegetation is expected to change. There would be less mulch generated, but, because winter moisture levels would be lower, less mulch would decompose. How this would affect the total amount of persistent biomass is unclear and would depend on the amount and pattern of precipitation as well as on the activities of herbivores. With less precipitation, there would be less annual production and, overall, less food and water resources for animals.

With a drier climate, there should be more drought years, more years where the introduced annual grasses do poorly, and more years where the grassland vegetation is dominated by native drought-adapted species with long-lived seeds. However, there may be an invasion of weedy exotic species now prevalent in California deserts such as yellow star thistle and tamarisk. With fewer wet years, soils moisture content would decrease, and dust emissions would likely increase and management may be needed to control exposure to releases of hazardous air pollutants.

3.8 Soil Resources

3.8.1 Introduction

This section describes soil resources in the Planning Area, including faults and slopes.

3.8.2 Regulatory Framework

Regulations for geologic and soils resources include:

- **Alquist-Priolo Earthquake Fault Zoning Act of 1972** (Public Resources Code, Section 2621 et seq.). The Alquist-Priolo Earthquake Fault Zoning Act of 1972 applies to development projects, and is designed to protect the health and safety of people from geologic hazards.
- **General Plans and/or SOAR Initiatives.** The General Plan from local cities and counties may provide regulations or guidelines relating to seismic hazards and soil resources as it applies to agriculture.

Additional regulations such as those related to rangeland, paleontological resources, and water/wetlands are addressed in those sections of this report.

3.8.3 Regional Setting

The Planning Area is within the California Coast Ranges of the Pacific Border Physiographic Province. CCMA is located in the southernmost extension of the Diablo Range between the San Andreas Fault zone to the west and the San Joaquin valley to the east. Topography is rugged with an elevation range of 1,830 at Pine Canyon to 5,241 feet on San Benito Mountain.

3.8.4 Current Conditions and Trends

3.8.4.1 Geology

The CCMA is composed of two primary geologic units including 1) the New Idria serpentine mass at the core of the management area (32,000 acres total), and 2) nonserpentine sedimentary rock complex which surrounds the serpentine mass (42,000 acres total) (ref. Map 5, Appendix I). The Serpentine ACEC entirely contains and is delineated by the New Idria serpentine mass. The Tucker, San Benito River, Condon, and Cantua Zones are composed almost entirely of a nonserpentine sedimentary rock complex. The 15 mile long by 5 mile wide New Idria serpentine mass forms the center of an asymmetric anticlinal dome which is flanked by Jurassic and Cretaceous-aged sedimentary rocks (Coleman, 1986). The dome demarcates the northernmost extension of the Coalinga anticline. High angle faults and shear zones surrounding the dome serve as a record of the tectonic movement of the New Idria serpentine mass up through the adjacent sedimentary rock complex.

The New Idria serpentine mass was formed from peridotite (harzburgite or dunite) which has been completely mineralogically-altered, sheared, and crushed to yield a nearly incoherent mass of serpentinite (Coleman, 1986; Coleman, 1996). The serpentinization and shearing process also produced abundant chrysotile asbestos widely disseminated throughout the serpentine mass. As such, the New Idria serpentine mass contains one of the largest reserves of chrysotile asbestos in North America (Merritt, 1962).

The poor structural integrity of the New Idria serpentine mass has resulted in an unstable terrain composed of low, rounded hills that have a high tendency to slide when slopes become over-steepened. Evidence of this unstable terrain is represented by many prehistoric (<30 million years old; Miocene age) landslides including those which deposited serpentine in the nearby Vallecitos Valley and Big Blue Hills (Casey and Dickson, 1976). Smaller, more geologically recent landslides (< 10,000 years old; Holocene age) are indicated by tongues of material that project outward from the serpentine mass on the northern and eastern boundaries (Cowan and Mansfield, 1979). The New Idria serpentine mass contains many economically-important minerals including cinnabar (mercury sulfide), chromite (iron-chromium oxide), and asbestos, which have all been commercially-mined during the past 150 years. The serpentine mass also hosts many rare minerals including jadeite, fresnoite, joaquinite, neptunite, and benitoite which are highly valued by gem and mineral collectors. The privately-owned Gem Mine within the CCMA is the only known source of gem-grade benitoite in the world.

The surrounding sedimentary rock complex is composed of three formations including the Jurassic-aged Franciscan formation and the Cretaceous-aged Moreno and Panoche formations. The Franciscan formation is primarily comprised of greywacke sandstone, greenstone, and chert, while the Moreno and Panoche formations are composed of marine sandstone and shale. The structure of the steeply-inclined sedimentary rocks has resulted in rugged terrain punctuated by steep slopes and deep gorges.

3.8.4.2 Soils

Soil types

Soil type varies greatly throughout the CCMA and is strongly influenced by parent material (bedrock type), topography, local precipitation, and vegetation cover. Like, the geologic units, soil type may also be divided into those derived from serpentine and those derived from nonserpentine parent materials such as sandstone and shale. Since the serpentine-derived soils of the CCMA are derived from the asbestos-rich New Idria serpentine mass, those soils typically contain high concentrations of asbestos. In general, soil types may be grouped as "serpentine soils" and "nonserpentine soils." Map 5 in Appendix I shows the distribution of soil series within the CCMA. The Serpentine ACEC Zone consists almost entirely of serpentine soils, whereas the Tucker, San Benito River, Condon, and Cantua Zones located outside of the Serpentine ACEC, consist primarily of nonserpentine soils. Table 3.8-1 below summarizes all of the soil series found within the CCMA and how they are categorized for analysis as "serpentine soils" and "nonserpentine soils."

Table 3.8-1. Attributes for soil series found within the CCMA. Soils derived from serpentine (asbestos-rich). Soils derived from nonserpentine parent materials (sandstone, shale).

Soil Series	Unit	Parent material	Slope (%)	Permeability class	Surface runoff class	Erosion hazard	Soil survey
Atravesada-Pits	765	Serpentine	2 to 30	Moderate	Medium	Not determined	Western Fresno County
Atravesada-Pits, asbestos complex	767	Serpentine	30 to 65	Moderately slow-Moderate	Very rapid	Not determined	Western Fresno County
Dumps-Pits, complex, asbestos	769	Serpentine	2 to 30	Not determined	Not determined	Not determined	Western Fresno County
Henneke fine gravelly loam; eroded	HnF2	Serpentine	15 to 50	Slow	Rapid-Very rapid	Moderate-Severe	San Benito County
Henneke soils, severely eroded	HsG3	Serpentine	15 to 75	Slow	Rapid-Very rapid	Very severe	San Benito County
Hentine-Rock outcrop complex	773	Serpentine	30 to 65%	Moderately slow	Very rapid	Not determined	Western Fresno County
Hentine-Franciscan rock outcrop complex	774	Serpentine	30 to 65	Moderately slow	Very rapid	Not determined	Western Fresno County
Mine pits and dumps	MnG	Serpentine	Not specified	Excessive	Rapid	Not determined	San Benito County
Montara rocky silty clay loam	MtF2	Serpentine	15 to 50	Moderately slow	Rapid-Very Rapid	Severe-Very Severe	San Benito County
Climara clay	CmF2	Serpentine, Graywacke, and/or Schist	15 to 50	Slow	Medium-Rapid	Moderate-Severe	San Benito County
Igneous rock land	IgC	Serpentine or Igneous rock	Not specified	Not determined	Not determined	Not determined	San Benito County
Yolo loam	YoC	Allivium derived from sandstone and shale	2 to 9	Moderate	Slow-Medium	None-Slight	San Benito County
Anela-Vernalis association	741	Allivium derived from sandstone and shale	0 to 5	Moderately slow	Negligible	Not determined	Western Fresno County
Kettleman loam; eroded	KeF2	Calcareous sandstone and shale	15 to 50	Moderate	Rapid-Very rapid	Severe-Very severe	San Benito County
Kettleman soils, eroded	KmF2	Calcareous sandstone and shale	15 to 50	Moderate	Rapid-Very rapid	Severe-Very severe	San Benito County
Nacimiento clay loam	NaE	Calcareous sandstone and shale	15 to 30	Moderately slow	Medium-Rapid	Moderate-Severe	San Benito County
Nacimiento clay loam; eroded	NaF2	Calcareous sandstone and shale	30 to 50	Moderately slow	Rapid-Very rapid	Severe-Very severe	San Benito County
Nacimiento clay loam; eroded	NaG2	Calcareous sandstone and shale	50 to 75	Moderately slow	Rapid	Very severe	San Benito County
San Benito clay loam	SbD	Calcareous sandstone and shale	9 to 15	Moderately slow	Medium	Moderate	San Benito County
San Benito clay loam; eroded	SbE2	Calcareous sandstone and shale	15 to 30	Moderately slow	Rapid	Severe	San Benito County
San Benito clay loam; eroded	SbF2	Calcareous sandstone and shale	30 to 50	Moderately slow	Rapid-Very rapid	Severe-Very severe	San Benito County
San Benito clay loam; severely eroded	SbF3	Calcareous sandstone and shale	30 to 50	Moderately slow	Rapid-Very rapid	Severe-Very severe	San Benito County
Sorrento gravelly loam	SoB	Calcareous sandstone and shale	0 to 5	Moderate	Very slow-Slow	None-Slight	San Benito County
Sorrento silt loam	SnC	Calcareous sandstone and shale	2 to 9	Moderate	Slow-Medium	None-Slight	San Benito County
Sorrento silty clay loam	SrC	Calcareous sandstone and shale	2 to 9	Moderately slow	Very slow-Slow	None-Slight	San Benito County
Domengine-Lilten-Rock outcrop complex	740	Calcareous sandstone and shale	30 to 65	Slow	Very rapid	Not determined	Western Fresno County
Grazer-Wisflat-Arburua association	745	Calcareous sandstone and shale	8 to 50	Slow	Very rapid	Not determined	Western Fresno County
Lilten-Grazer-Arburua association	747	Calcareous sandstone and shale	15 to 55	Slow	Very rapid	Not determined	Western Fresno County
Borreguero-Grazer-Rock outcrop association	755	Calcareous sandstone and shale	15 to 65	Moderately slow	Very rapid	Not determined	Western Fresno County
Gazos clay loam	GtE2	Clay shale	15 to 30	Moderately slow	Rapid	Severe	San Benito County
Gazos clay loam	GtF2	Clay shale	30 to 50	Excessive	Rapid-Very rapid	Severe-Very severe	San Benito County
Gazos clay loam	GtG3	Clay shale	50 to 75	Excessive	Rapid	Very severe	San Benito County
Gazos silty clay loam	GsD	Clay shale	9 to 15	Moderately slow	Medium	Moderate	San Benito County
Getrail-Vernando-Rock outcrop association	735	Marine sandstone	15 to 65	Slow-Moderately rapid	Medium-Very rapid	Not determined	Western Fresno County
Rock outcrop-Borreguero complex	757	Marine sandstone	30 to 65	Moderately slow	Very rapid	Not determined	Western Fresno County
Wisflat-Borreguero-Rock outcrop complex	758	Marine sandstone	50 to 70	Moderately slow-Moderately rapid	Very rapid	Not determined	Western Fresno County
Lilten-Millsholm association	744	Marine sandstone and shale	30 to 65	Slow-Moderate	Very rapid	Not determined	Western Fresno County
Millsholm-Borreguero complex	743	Marine sandstone and shale	30 to 65	Moderately slow-Moderate	Very rapid	Not determined	Western Fresno County
Millsholm-Wisflat-Lilten association	742	Marine sandstone and shale	30 to 65	Slow-Moderately rapid	Very rapid	Not determined	Western Fresno County
Roacha-Millsholm-Lilten association	770	Marine sandstone and shale	30 to 65	Slow-Moderate	Very rapid	Not determined	Western Fresno County
Rock outcrop-Wisflat-Arburua complex	746	Marine sandstone and shale	50 to 65	Moderately rapid-Moderate	Rapid-Very rapid	Not determined	Western Fresno County
Vallecitos loam	VaF	Metamorphosed sandstone and shale	15 to 30	Slow	Rapid	Moderate-Severe	San Benito County
Vallecitos rocky loam; eroded	VrF2	Metamorphosed sandstone and shale	30 to 50	Slow	Rapid-Very rapid	Severe-Very severe	San Benito County
Los Gatos clay loam	LvE	Sandstone	15 to 30	Moderately slow	Medium-Rapid	Moderate-Severe	San Benito County
Los Gatos clay loam; eroded	LvF2	Sandstone	30 to 50	Moderately slow	Rapid-Very rapid	Severe-Very severe	San Benito County
Gaviota loam	GaE	Sandstone and shale	15 to 30	Moderate	Medium-Rapid	Moderate-Severe	San Benito County
Gaviota loam; eroded	GaE2	Sandstone and shale	15 to 30	Moderate	Rapid	Severe	San Benito County
Gaviota loam; eroded	GaE2	Sandstone and shale	15 to 30	Moderate	Rapid	Severe	San Benito County
Gaviota loam; eroded	GaF2	Sandstone and shale	30 to 50	Moderate	Very rapid	Severe-Very severe	San Benito County
Gaviota rocky loam	GrF2	Sandstone and shale	15 to 50	Excessive	Rapid-Very rapid	Severe-Very severe	San Benito County
Sedimentary rock land	SeG	Sandstone and shale	Not specified	Not determined	Not determined	Not determined	San Benito County
Riverwash	Rw	Mixed alluvium	Not specified	Not determined	Not determined	Not determined	San Benito County
Sandy alluvial land	Sc	Mixed alluvium	Not specified	Not determined	Not determined	Not determined	San Benito County
Badland	BaG	Not specified	Not specified	Not determined	Rapid	Not determined	San Benito County
Landslides	LdF	Not specified	Not specified	Not determined	Not determined	Not determined	San Benito County

Soil erosion

Susceptibility of a soil to erosion is dependent upon a complex combination of soil factors including vegetative cover, soil aggregate stability (factor of organic matter and clay content), soil permeability (infiltration), and slope. Table 3.8-1 summarizes the slope, permeability class, surface runoff class, and erosion hazard for soils found within the CCMA. Although most soil types within the CCMA have moderate permeability, most of the soils are located on slopes between 15 and 75% grade which causes them to have medium to very rapid runoff, resulting in a moderate to very severe erosion hazard.

The Atravesada and Henneke serpentine soil series are especially vulnerable to erosion due to sparse vegetative cover. Erosion assessment of serpentine barrens within the CCMA was conducted by PTI Environmental Services (1993) and Dynamac Corporation Environmental Services (1998). The PTI (1993) study focused exclusively on the Clear Creek watershed. Clear Creek is classified as an impaired watershed due to excessively high sediment rates and elevated mercury levels. Erosion factors including soil type, slope, vegetative cover, and road/trail type and concentration per unit area were used to estimate erosion rates for subwatersheds within the Clear Creek watershed. That study identified nine subwatersheds out of a total of forty-one, which had estimated erosion rates of more than 3,000 yd^3/year (Figure 1). Most of the subwatersheds were rated at between 1,000 and 3,000 yd^3/year. PTI's best management practice recommendations for erosion and sediment control included limiting OHV access to soils having high erosion risk and structural erosion controls such as water energy dissipaters and sediment retention catchments.

Dynamac (1998) conducted a more extensive evaluation of the erosion risk of serpentine barrens and their associated watersheds throughout the CCMA. Individual barrens and watersheds were relatively ranked based on a combination of key attributes that determine erosion risk and sediment delivery including drainage area size, barren area percentage of drainage area, soil color (indicator of soil disturbance), vegetative cover, gullying, slope, stream order, OHV use density, soil armoring (gravel lag), mining history, accessibility, and sediment trapping capability. A total of eleven watersheds and forty-seven barren polygons were evaluated throughout the CCMA. Following rank calculations, the results were divided into three erosion and sediment delivery groups including minor contributors, "at risk", and major contributors. Eleven barren polygons were ranked as minor contributors, twenty-four were ranked as "at risk", and twelve were ranked as major contributors. Dynamac's best management practice recommendations for erosion and sediment control included silt fences, erosion control blankets, rock backfilling of gullies, check dams, interceptor dike and swales, sediment basins, rock filters, and gabion mattresses. Erosion and sediment control measures currently implemented by the BLM at the CCMA include vehicle barriers (fences), water diversion, rock armoring, rock gabion mattresses, gully plugs, sediment catchments, check dams (straw bales), and erosion control blankets (jute).

The results of the PTI and Dynamac studies were important in the CCMA route designation process (2006 ROD). Although extensive watershed-level studies on erosion and sediment delivery rates have been conducted for the New Idria serpentine mass, essentially no studies have been conducted for the nonserpentine watersheds surrounding the serpentine mass.

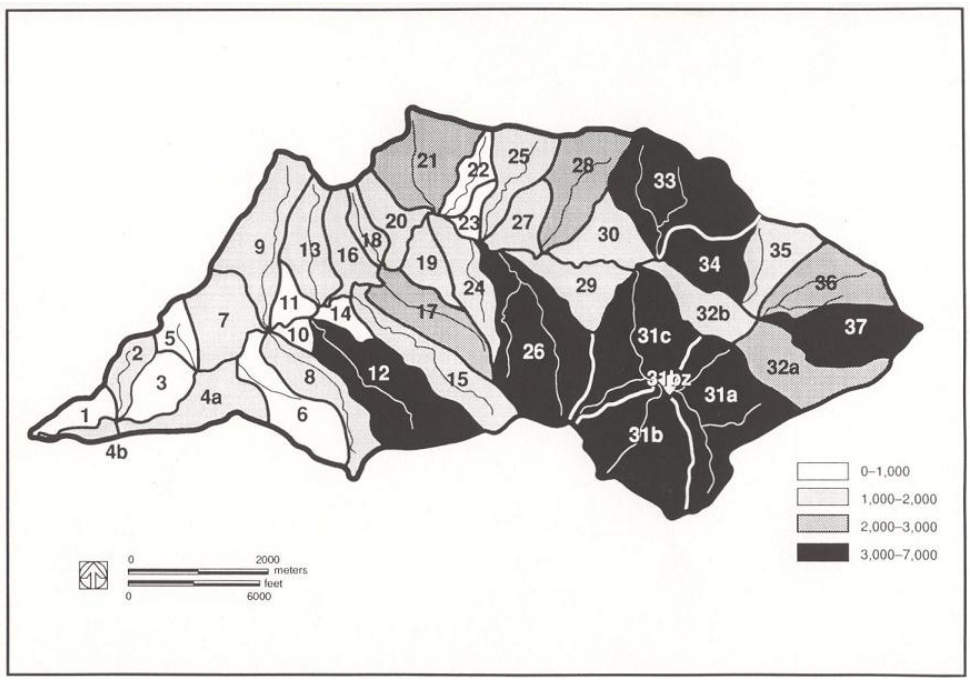


Figure 1. Estimated erosion (yd^3/year) from subwatersheds (numbered 1 to 37) in the Clear Creek watershed as predicted by the Universal Soil Loss Equation. Figure from PTI (1993). Clear Creek appears as a bold line bisecting the watershed from left to right.

Soil fertility and vegetative cover

Parent material strongly influences the physical and chemical properties of soils derived from it. Those soil physical and chemical properties, in combination with topography and local climatic factors, determine the vegetative cover types that a soil type may support. Serpentine soils are stressful for plant establishment and productivity due to severe nutrient deficiency (nitrogen, phosphorus, potassium, calcium) and toxic concentrations of heavy metals (magnesium, nickel, chromium, cobalt) derived from the underlying serpentine parent material (Kruckeberg, 1984; Brooks, 1987). Due to the harsh growing conditions imposed by serpentine soils, the Atravesada and Henneke soil series within the CCMA are sparsely vegetated and have a preponderance of natural barrens which are very susceptible to both wind and water erosion (Figure 2). When left undisturbed, soils of the serpentine barrens develop a gravel lag (through removal of finer particle sizes) which partially protects the soil from further erosion (Figure 3). Soils derived from nonserpentine parent materials such as sandstone and shale, in contrast, are relatively fertile and support dense vegetative cover. Although nonserpentine soils have higher fertility and support more vegetative cover, natural revegetation following disturbance can be slow with the disturbed soils being highly susceptible to erosion (Figure 4).

Figure 2. Severely eroded serpentine barren. Henneke soil series.

Figure 3. Natural gravel lag on serpentine barren. Henneke soil series.

Figure 4. OHV impacts and erosion on Gaviota soil series (above Jade Mill campground) within the CCMA. Erosion control including straw bales and straw rolls were installed in gullies and rills to slow erosion.

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3.9 Water Resources

3.9.1 Introduction

Water resources refer to all surface water runoff into rivers and creeks within the CCMA and the values that this water provides to people, wildlife, and vegetation. The San Benito River is impounded by a dam, forming the Hernandez Reservoir, approximately six miles north of the mouth of Clear Creek. The Hernandez Reservoir provides for groundwater recharge for northern San Benito County. The State of California Regional Water Control Boards (CRWCB) with jurisdiction over water resources in the CCMA, as authorized by the Environmental Protection Agency under the Clean Water Act are: the Central Valley Regional Water Control Board and the Central Coast Regional Water Control Board. The former agency oversees all waters flowing into the Central Valley, known collectively as the "West Side Streams", and the latter agency oversees those waters within the CCMA that flow into the San Benito River.

The Central Valley Regional Water Control Board has designated nine beneficial uses for this the "West Side Streams" (SWRCB 1975): Agricultural Supply (i.e. vegetation for livestock grazing), Industrial Process Supply (i.e. fire protection), Water Contact Recreation (i.e. swimming and wading), Non-Contact Water Recreation (i.e. camping, hunting and hiking), Warm Fresh Water Habitat (i.e. to sustain warm water aquatic species), Wildlife Habitat (i.e. for food, water, and shelter for wildlife), Preservation of Rare and Endangered Species, and Groundwater Recharge.

The Planning Area is encompassed by two hydrologic regions: Central Coast and San Joaquin River. Approximately 11 waters and 43 National Wetlands Inventory mapped wetlands exist within the Planning Area. These aquatic areas function to recharge aquifers, slow flood waters, and assimilate and neutralize some pollutants before they enter rivers and lakes.

Water demand exceeds water supply in many areas throughout the Planning Area, though more commonly east of the coast range. Watershed function and improved water quality is key to increasing water supply to support various resource needs within the Planning Area.

3.9.2 Regulatory Framework

Water resources and quality are managed and protected under multiple regulations and policies, including:

- **U.S. Clean Water Act (33 USC 1251)** – aims to restore and maintain the chemical, physical, and biological integrity of the Waters of the United States. Section 303(d) of the 1972 Clean Water Act requires states to identify waterbodies that do not meet water quality objectives and are not supporting their beneficial uses. Each state must submit an updated list, called the 303(d) list, to the U.S. EPA every two years. In addition to identifying the waterbodies that are not supporting beneficial uses, the list also identifies the pollutant or stressor causing impairment, and establishes a priority for developing a control plan to address the impairment. The list also identifies waterbodies where 1) a TMDL has been approved by U.S. EPA and an implementation is available, but water quality standards are not yet met, and 2) waterbodies where the water quality problem is being addressed by an action other than a TMDL and water quality standards are not yet met.
- **Watershed Protection and Flood Prevention Act (16 USC 1001-1009).**
- **Safe Drinking Water Act, as amended, 33 USC 1531 et seq.**

- **Executive Order 11990:** Protection of wetlands – establishes the protection of wetlands and riparian systems as the official policy of the federal government. It requires all federal agencies to consider wetland protection as an important part of their policies; take action to minimize destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands.
- **Porter Cologne Water Quality Act of 1969:** Contains a complete framework for the State Water Resources Control Board (SWRCB) to regulate waste discharges to both surface waters and groundwater of the state.

3.9.3 Regional Setting

The Planning Area encompasses eleven watersheds located within the CCMA: Clear Creek, Larious Creek, Upper San Benito River, San Carlos Creek, East Fork San Carlos Creek, Cantua Creek, Sawmill Creek, Picacho Creek, Diaz Creek, Arroyo Leona Creek, and White Creek. These areas represent distinct watersheds, often with extreme geographic, topographic, and mineralogical variability. The watersheds are drained by higher order perennial streams that, with the exception of White Creek and Diaz Creek, descend from San Benito Mountain. White Creek descends from Wright Mountain and flows to the southeast, converging with Diaz Creek and then with Los Gatos Creek, which flows into Arroyo Pasajero near Coalinga and thence drains into a landlocked basin in the southern San Joaquin Valley. Clear Creek and Picacho Creek converge with the San Benito River, which discharges into the Pajaro River watershed, which drains into Monterey Bay. Larious Creek and both forks of San Carlos Creek flow to the north where they discharge to Silver Creek and thence into the Panoche Creek watershed, which drains into the San Joaquin River, which empties into San Francisco Bay.

The topography of the CCMA is dominated by convex gently sloping ridges, with slopes becoming quite steep as they approach the stream channels and inner gorges. Elevations within the CCMA range from approximately 2,500 feet at the mouth of the drainage to 5,000 feet along the crest of the Diablo Range. The ridges and slopes are dominated by naturally occurring areas of serpentinite soils forming complexes of barren areas interspersed with chaparral and conifers. Climate within the Planning Area is Mediterranean with cool, wet winters and hot, dry summers; there is commonly a water supply surplus in the winter and deficit during the summer (Cal Alive 2005). Annual precipitation varies across the Planning Area from 8 inches on the drier eastern side of the Diablo Mountains to 40 inches in Hernandez Valley.; the predominant form of precipitation is rainfall (CARA 2005). Water demand exceeds water supply in many areas throughout the Planning Area.

The serpentine watershed and riparian areas in the CCMA have been subject to widespread surface disturbances over the last century. In general, the watershed conditions observed in the CCMA reflect naturally high rates of erosion that have been accelerated by human impacts. These watershed conditions result from a long history of surface disturbance, beginning in the mid-1850, from road construction, logging, and mineral exploration and extraction, and in more recent times by off-road vehicle travel and recreation. These watersheds have high erosion rates due to the steep, unstable slopes which are composed of soft sheared serpentine bedrock. Since the mid-1970's motorized vehicle recreation has been the dominant public use within the area. Road maintenance operations and techniques also influence erosion and sedimentation rates. Maintenance of the route network is based on the BLM's Protocol for Monitoring Soils, Vegetation, and Species of Concern On and Near Designated OHV Trails in California Lands Managed by the BLM (15 October 2002), to prioritize the work and determine the appropriate measures to reduce erosion and off-site sedimentation impacts, and to provide for safe motorized access.

The riparian zones around the perennial streams and some intermittent streams, and the barren or sparsely vegetated serpentine slopes, exhibit a fragile ecology, diversity and assemblage of rare and unique plants. In addition, several special status plant and animal species occur in the CCMA and are dependent in some

stage of their life cycles on proper functioning condition of creeks and streams. In total, Clear Creek and surrounding watersheds support plant and animal communities that are important from the perspective of California native biodiversity. The management of watershed resources for the CCMA necessitates understanding the relationships between surface water, soil erosion and sedimentation, with respect to surface disturbances from human activities.

3.9.4 Current Conditions and Trends

3.9.4.1 Surface Water

The Central Coast Regional Water Control Board has not specifically designated beneficial uses for any streams in the CCMA that drain into the San Benito River. Designated uses for the San Benito River include; Municipal and Domestic Water Supply, Agricultural Supply, Industrial Service Supply, Groundwater Recharge, Recreation Contact/Non-Contact, Wildlife Habitat, Freshwater Habitat, Spawning and Reproduction, Freshwater Replenishment, and Commercial and Sport Fishing. Designated uses for the Hernandez Reservoir include those listed for the San Benito River and Navigation.

Because heavy metals and asbestos are concerns in this area, the BLM contracted a water quality study (Dynamac, 1998) to determine the magnitude of heavy metals being deposited into streams from 15 abandoned mines. Soil and water sampling was completed below, at, and above each of the mined areas. Results from this study produced important findings. The background concentration of metals detected in soils tended to be above stated standards, and is consistent with the natural geochemistry of the area. However, differences in the water samples taken from below and above mined sites indicated that disturbed areas are contributing to metal concentrations over and above the naturally high levels. Accessibility by vehicles was also found to potentially be a factor in increasing concentrations of metals transported in the water downstream. As a result of this study, five mine areas, the Alpine, the Aurora, Clear Creek, Larious Canyon, and the Molina were determined to not only pose the greatest ambient hazard in terms of inhalation of hazardous materials, but also pose the greatest water contamination risk.

To evaluate the potential threat to human health, BLM compared the results of surface water analyses (Dynamac, 1998) to Federal drinking water regulations. From six mine sites, down gradient surface water samples contained concentrations of antimony, cadmium, chromium, mercury, and nickel that exceeded the Maximum Contaminant Levels (MCLs). On Clear Creek and the San Benito River, where multiple sampling points were established, cumulative, increasing concentrations did not appear to occur. Mine sites in the San Carlos and Larious Creek watersheds were the only locations where metals were detected at concentrations three times the background levels. In general, the metal concentrations detected in the Clear Creek watershed were very low. Mercury compounds were the most prevalent metal compounds detected, occurring in all but one sample, over the five watersheds. Results from combined surface water sample data for the San Benito watershed indicated background and down gradient concentrations of nickel that exceeded the MCL. The San Carlos watershed exhibited means background and down gradient concentrations of mercury that exceed the MCL. The surface water exposure pathway would appear to present a minimal risk to recreation users of the CCMA, because of the limited number of days that a typical user visits, and the fact that the surface water is generally not used as a potable water source. The Alpine Mine and Larious Canyon would present the greatest exposure to users.

Existing conditions of riparian areas addressed in this document are listed below, in Table 3.9-1.

Table 3.9-1 CCMA Existing Riparian Conditions

NAME OF RIPARIAN WETLAND	DATE OF SURVEY	SEGMENT/REACH IDENTIFICATION	MILES	ACRES	RATING	TREND
PICACHO CREEK	9/20/1993	COALINGA SM, T 18S., R12E., SEC 19, 30 T18S., R11E., SEC 25	2	6	PFC	NA
WHITE CREEK	REVISED, 3/25/2005	COALINGA SM, T19S., R13E., SEC 4, 8, 9, 17	2.75	9.3	FAR	DOWN
LARIOUS CREEK	REVISED, 3/25/2005	COALINGA SM, T17S., R11E., SEC 26, 35, 36	2.5	7.6	FAR	DOWN
EAST FORK OF SAN CARLOS CREEK	REVISED, 3/25/2005	COALINGA SM, T18S., R12E., SEC 2, T17S., R12E., SEC 22, 26, 35	1.4	4.2	FAR	NA
SAN CARLOS CREEK	REVISED, 3/25/2005	COALINGA SM, T18S., R12E., SEC 4, 5	1	3	FAR	NA
SAN BENITO RIVER 1 ABOVE HERNANDEZ DAM	REVISED, 3/25/2005	COALINGA SM, T18S., R12E., SEC 32, 5	0.75	7.25	FAR	NA
SAN BENITO RIVER 2 ABOVE HERNANDEZ DAM	REVISED, 3/25/2005	COALINGA SM, T18S., R12E. SEC 25, 26,	0.5	4.5	FAR	NA
SAN BENITO RIVER 3 ABOVE HERNANDEZ DAM	ADDED, 3/25/2005	COALINGA SM., T17S., R10E. SEC 16, 17	0.25	2.25	FAR	NA
CANE CANYON	9/20/1993	COALINGA SM, T17S., R11E., SEC 30, 31	1.25	3.8	FAR	NA
CLEAR CREEK & TRIBUTARIES (SEE COMMENTS BELOW)	9/20/1993	COALINGA SM, T18S., R12E., SEC 8, 9, 17 T18S., R11E., SEC 1, 11, 12, 15, 16	7	42.4	NON	
SAWMILL CREEK (REVISED CONDITION 9/12/ 2000)	9/20/1993 (FAR/DOWN)	COALINGA SM, T18S., R12E., SEC 1, 4, 15, 22	1.5	4.5	FAR	UP

MILES OF PROPER FUNCTIONING CONDITION (PFC)=	2	ACRES PROPER FUNCTIONING CONDITION (PFC)=	6
MILES OF FUNCTIONING AT RISK (FAR)=	11.9	ACRES FUNCTIONING AT RISK (FAR)=	46.4
MILES OF NONFUNCTIONAL (NON)=	7	ACRES NONFUNCTIONAL (NON)=	42.4
MILES OF UNKNOWN (UNK)=	0	ACRES UNKNOWN (UNK)=	0
MILES OF FUNCTIONING AT RISK/UNKNOWN (FAR/UNK)=	0	ACRES FUNCTIONING AT RISK/UNKNOWN (UNK)=	0
TOTAL MILES=	20.9	TOTAL ACRES=	94.8

Table 3.9-1 CCMA Existing Riparian Conditions (cont.)

RIPARIAN AREA CONDITIONS AND NUMBER		MILES	ACRES	PROPER FUNCTIONING CONDITION (PFC)=	1
PFC	1	2	6	FUNCTIONING AT RISK (FAR)=	9
FAR WITH AN UPWARD TREND	1	1.5	4.5	NONFUNCTIONAL (NON)=	1
FAR WITH A DOWNWARD TREND	2	5.25	16.9	UNKNOWN	0
FAR WITH A NON APPARENT TREND	6	5.15	25	FUNCTIONING AT RISK/UNKNOWN (FAR/UNK)=	0
FAR WITH AN UNK TREND	0	0	0		TOTAL = 11
FAR WITH A DOWNWARD OR UNKNOWN TREND	0	0	0		
NON FUNCTIONING	1	7	42.4	UPWARD TRENDS (UP)=	1
TOTAL NUM-BER	11	20.9	94.8	DOWNWARD TRENDS (DOWN)=	2
				NOT APPARENT TRENDS (NA)=	6
				UNKNOWN TRENDS (UNK)=	0
				DOWNWARD/UNKNOWN TRENDS (DOWN/UNK)	0
					TOTAL = 9
				COMMENT ADDRESSING CLEAR CREEK & TRIBUTARIES:	
				Due to surface evidence it was rated as nonfunctional, downward trend. It may be functioning at risk near its capacity. MARCH 25, 2005, COMMENT --NEED TO DETERMINE REACHES AND FUNC-TIONING CONDITIONS	

Reports or watershed assessments used in the preparation of this document are listed below, in Table 3.9-2.

Table 3.9-2 Watershed Assessments or Reports within the Planning Area

Watershed Assessment (CCMA watershed in parentheses)	Date
Arroyo Pasajero Watershed Management Plan (White Creek and Diaz Creek)	Jul. 1999
Panoche/Silver Creek Watershed Assessment (Larious Creek, E. & main fork of San Carlos Creek)	Sep. 1998
Silver Creek/Panoche Alluvial Fan Assessment Draft Report (Larious & forks of San Carlos Creeks)	May 2005
Assessment of the Little Panoche and Cantua Creek Watersheds (Cantua Creek)	May 2004
Clear Creek TMDL (Clear Creek, San Benito River)	Mar 2004

A summary of surface water information provided within various watershed reports and assessments is included below. This summary provides an overview of surface water conditions in the Planning Area with focus on the coastal and eastern portions of the Planning Area.

Arroyo Pasajero Watershed

The Arroyo Pasajero Watershed has a contrast of between 22 and 8 inches of annual rainfall from the upper and lower portions of the watershed. Severe incision, stream bank cutting, stream bank meandering, and lateral erosion affect riparian function within the watershed area and occur primarily during high intensity runoff and are exacerbated by heavy grazing in the riparian area. Tamarisk trees, which are a problematic noxious plant species throughout the west, continue to influence channel flow by deflecting the flow toward channel banks and increasing channel meander but also impede lateral bank erosion.

Cantua Creek Watershed

Most streams within the Cantua Creek watershed are ephemeral with a few reaches of intermittent flows also occurring. Runoff from these drainages has historically resulted in transport of sediment and selenium, boron, salts, and other trace elements during large runoff events onto the alluvial fan area and into the California Aqueduct. Localized areas of incision, bank failures and gullying increase erosion within the watersheds.

Panoche/Silver Creek Watershed

Surface water quality is poor due to the underlying marine shales and sandstones. This water is very high in selenium and other salts which can be deposited into the downstream irrigated farmland. The primary water quality degradation issues caused by the large rainfall events include flooding, sediment deposition, and contamination.

San Benito River Watershed

In 2002, California State Water Resources Control Board listed the following streams as Clean Water Act Section 303 (d) Water Quality Limited Segments for; Clear Creek (mercury), San Benito River (fecal coliform and sedimentation), and Hernandez Reservoir (mercury). Clear Creek was previously identified as impaired by mercury on the 1998 CWA 303(d) list of impaired waterbodies.

In 2004, the Central Coast Regional Water Quality Control Board (CCRWCB) adopted a Total Maximum Daily Load (TMDL) for mercury in Clear Creek. The TMDL was established at 50 ng/L (0 .05 micrograms/L) for low flow conditions in Clear Creek. After the adoption of this TMDL, BLM contracted with the USGS to perform water quality measurements to comply with the TMDL.

After the first three years BLM (via USGS sampling) reported to the CCRWCB that the TMDL was not being met and established a study to determine where additional mercury mine waste was located which were responsible for the failure to meet the TMDL. Two additional abandoned mercury mines were located (Staging Area #2 and Staging Area #5) these sites were remediated in 2007, since that time BLM has met the CCRWCB mercury TMDL.

Since the temporary closure of this area to OHV use and the additional mercury mine remediation, the TMDL has been met for three years, which is the metric for this TMDL.

3.9.4.2 Groundwater

The Planning Area is underlain by two major aquifers systems: the Central Valley Aquifer System comprised of unconsolidated sand and gravel aquifers, and the California Coastal Basin aquifers which are also comprised of unconsolidated sand and gravel aquifers (National Atlas 2005). Other bedrock

aquifers are also described in the Planning Area (Carmel 2004). Groundwater depths vary from 12,000 feet below ground surface (bgs) within the San Joaquin Valley to 180 feet bgs along the Central Coast.

The following summary describes relevant groundwater information provided within the watershed reports and assessments identified in Table 3.9-2.

Arroyo Pasajero Watershed

In most of the Arroyo Pasajero Watershed, clay separates an upper aquifer from a lower aquifer; the upper aquifer has poorer water quality so most of the groundwater is extracted from the lower aquifer with wells generally drawing their water from 500 to 2000 feet bgs. In some areas (Pleasant Valley), groundwater is withdrawn from a single unconfined aquifer and wells generally range from 200 to 800 feet bgs.

Primary aquifer recharge is from surface flow runoff primarily during flood events. A prolonging of surface base flows would increase the period of effective groundwater recharge and help reduce historic overdraft and water quality conditions in the Pleasant Valley area. Concentrations of salts, chlorides, sulfates, and boron in groundwater reduce crop yields and limit the types of crops that may be effectively grown in some Pleasant Valley areas.

Panoche Creek Watershed

According to the most recent summary of groundwater in the basin (DWR 2003), driller's logs for nine wells in the basin indicated that wells ranged in depth from 171 feet to 1,500 feet. Wells generally penetrate alluvial materials including gravels, sands, silts and clays. Additional descriptive units include shale, clay and rocks, and hard sand. From this information it seems likely that the water bearing units may include the alluvium, Quaternary nonmarine terrace deposits and Plio-Pleistocene nonmarine sediments. Water level measurements for 48 wells were found in the San Joaquin District water level data files. These measurements range in time from 1967 to 2000. Depth to water ranges from 30 to over 300 feet, with most of the measurements being in the 30 to 80 foot range. There is a general trend of rising water levels from the 1970's to 2000. Water levels have risen as much as 130 feet and typically over 40 feet throughout the basin. Field reconnaissance in August 2001determined that irrigated agriculture was limited to one vineyard of less than 20 acres and one walnut orchard of less than 20 acres. A 2002 interview with a 76-year-old life-long resident of Panoche Valley, revealed that in the 1940's extensive areas of alfalfa were in production and in the 50's and 60's cotton was extensively grown in the basin. It appears that groundwater levels are recovering from a past period of groundwater pumping.

San Benito River Watershed

A recent study of the San Benito River Valley (DWR 2003) groundwater basin found no specific published information on water bearing deposits. A review of San Joaquin District well completion report files found 33 well reports in the basin. Wells ranged from 36 to 600 feet bgs and encountered alluvial materials as well as consolidated rock formations. Well yields ranged from a dry hole to 2,000 gpm. The highest yielding wells, one at 2,000 gpm and one at 1,100 gpm, are in alluvial material near the San Benito River.

3.9.4.3 National Wetland Inventory

The U.S. Fish and Wildlife Service's National Wetland Inventory lists 44 wetlands (excluding streams and rivers) within the boundaries of CCMA (ref. Table 3.9-3). Wetland types include Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands, Freshwater Ponds, Lakes, and miscellaneous water bodies categorized as 'Other.' Wetlands range in size from approximately 0.06 to 62 acres in size,

excluding Hernandez Reservoir, an impoundment on the San Benito River, which borders the NW corner of CCMA and which is approximately 400 acres in size.

Table 3.9-3 Wetlands identified in Clear Creek Management Area

Wetland Type	Number	Range in size (acres)	Total acreage
Freshwater Emergent Wetlands	12	0.098224 - 61.733511	86.020615
Freshwater Forested/Shrub Wetlands	9	0.058224 - 8.204925	9.271925
Freshwater Ponds	12	0.098242 - 1.300237	5.308859
Lakes	4	2.479048 - 400.368716	437.456126
Lakes (excluding Hernandez Reservoir)	3	2.479048 - 32.007113	
Other	6	0.177423 - 0.805119	2.347328
Total	**44**	**0.058224 - 400.368716**	**540.404853**
Total (excluding Hernandez Reservoir)	**43**	**0.058224 - 61.733511**	**140.036137**

3.10 Special Designations

3.10.1 Introduction

The FLPMA directs BLM to consider and evaluate lands for a number of special designations during the land use planning process. In general, lands are eligible for these types of designations based on the presence of particular values and qualities. These areas receive designation or special management through different processes and are managed under special considerations. The Planning Area includes existing Areas of Critical Environmental Concern (ACECs), Research Natural Areas (RNAs), and Wilderness Study Areas (WSAs), and potential Wild and Scenic Rivers (WSRs).

Even though management of public lands for wilderness values is not among rhe special designations listed above, this section also describes the results of BLM's inventory of lands with wilderness characteristics in the CCMA, in accordance with Section 201 of FLPMA (ref. Sec. 3.10.2.5 below).

3.10.2 Regulatory Framework

3.10.2.1 Areas of Critical Environmental Concern

BLM Manual 1613 – Areas of Critical Environmental Concern (BLM 1988) outlines the procedures for nominating, evaluating, and determining whether special management attention is required for potential ACECs. This process begins with compiling a list of areas recommended for ACEC designation. The BLM staff, other agencies, or members of the public may nominate lands for potential ACEC status.

Land use plans are required to identify goals, standards, and objectives for each ACEC, as well as management practices and uses, and may include necessary constraints and mitigation measures. The BLM is directed to develop ACEC management prescriptions in enough detail and specificity to minimize the need for subsequent ACEC management plans (BLM 1988, 2005).

3.10.2.2 Research Natural Areas

Research Natural Areas (RNA) are areas that contain important ecological and scientific values, where natural processes are allowed to predominate, and which is preserved for the primary purposes of research and education (43 CFR 8223). RNA's are designated because the land has one or more of the following characteristics:

- A typical representation of a common plant or animal association;
- An unusual plant or animal association;
- A threatened or endangered plant or animal species;
- A typical representation of common geologic, soil, or water features; or
- Outstanding or unusual geologic, soil, or water features.

Management and public use of the RNA are distinct from the ACEC because the management emphasis is on education and research. This allows management within the RNA to highlight the area's scientific importance, and still authorize appropriate public use.

3.10.2.3 Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 (WSRA) established a National Wild and Scenic Rivers System (NWSRS) for the protection of rivers with important scenic, recreational, fish and wildlife, and other

values. The act designated a number of river segments for immediate inclusion in the system and prescribed the methods and standards by which other rivers may be added to the system.

BLM's policy is to adhere to the requirements of the WSRA by identifying and evaluating "all rivers on BLM-administered lands to determine if they are appropriate for addition to the NWSRS" (BLM 1992). In this process, streams and rivers are first evaluated for their *eligibility* as potential additions to the NWSRS and then to determine the *suitability* of eligible streams – i.e., suitability being a higher standard than eligibility. Inclusion in the NWSRS requires action by Congress.

3.10.2.4 Wilderness Study Areas

Section 2(c) of the Wilderness Act of 1964 states that wilderness is an area of undeveloped Federal land in a natural condition, without permanent improvements or human habitation, which has outstanding opportunities for solitude or a primitive and unconfined type of recreation. In addition, a wilderness must comprise at least 5,000 acres of land or is of sufficient size to make its preservation and use practical. Wilderness may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. The original wilderness inventory of BLM public lands was performed pursuant to Sections 201 and 603 of the FLPMA, beginning in 1978. This process involved evaluating public lands to determine and locate areas containing wilderness characteristics that meet the criteria established in the Wilderness Act.

Areas identified as WSAs are to be managed under the interim management policy until they are designated wilderness or released by Congress (BLM 1995). Land use plans are tasked with identifying management direction for WSAs should they be released from wilderness consideration by Congress (BLM 2005).

3.10.2.5 Lands with Wilderness Characteristics

Section 201 of the Federal Land Policy and Management Act (FLPMA) requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values. This inventory requirement includes maintaining information regarding wilderness characteristics. Section 202 of FLPMA requires BLM to rely on resource inventories in the development and revision of land use plans, including inventory information regarding wilderness characteristics. Consistent with FLPMA and other applicable authorities, the BLM will continue to consider the wilderness characteristics on public lands as part of its multiple-use mandate in developing and revising land use plans and when making subsequent project level decisions.

BLM Instruction Memorandum (IM) 2011-154 further clarifies that the requirements of Sections 201 and 202 of FLPMA remain in effect. It also provides guidance on how to conduct and maintain wilderness characteristics inventories and provides guidance on how to consider lands with wilderness characteristics in the land use planning process. In accordance with NEPA, BLM offices must analyze the potential effects of proposed actions and alternatives for land use plan decisions on lands with wilderness characteristics when they are present.

3.10.3 Current Conditions and Trends

3.10.3.1 Serpentine Area of Critical Environmental Concern

In 1984, the BLM designated approximately 30,000 acres of the New Idria Serpentine Formation within the CCMA as the Clear Creek Serpentine Area of Critical Environmental Concern (ACEC). This ACEC is sometimes referred to as the Hazardous Asbestos Area (HAA). Areas of Critical Environmental

Concern are areas of concern where special management attention is required to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards. This Serpentine ACEC was designated because of the health concerns associated with the naturally occurring asbestos within the serpentine soils and because of the unique vegetation and forest types associated with serpentine soil.

Human induced changes within this geologically unique area, and the presence of distinctive plant species associated with the serpentine formation, established the need for special management attention. Human disturbance to the soils and plants in the Serpentine ACEC is a special management concern, because throughout the ACEC, soil formation tends to be slow, and the topsoil shallow. Additionally, plant regeneration is slow, and accelerated erosion from human activities (such as mining, road building and maintenance, and recreation) has negatively affected soil and vegetative resources. Minimizing soil erosion and damage to sensitive plant populations is a management priority. The Serpentine ACEC provides visitors with a variety of recreation experiences. However, due to the high concentrations of naturally occurring asbestos, public health concerns persist over the use of this popular recreation area.

The boundaries of the ACEC were defined by mapping of asbestos soils derived from the New Idria serpentine formation, and were delineated using identifiable landmarks, to the extent possible, and reflect the most current BLM policies for management of the public lands.

3.10.3.2 San Benito Mountain Research Natural Area

Within the Serpentine ACEC is the San Benito Mountain Research Natural Area (SBMRNA). An RNA is an area where natural processes are allowed to predominate and which is preserved for the primary purposes of research and education because the land has one or more of the following characteristics: (1) A typical representation of a common plant or animal association; (2) an unusual plant or animal association; (3) a threatened or endangered plant or animal species; (4) a typical representation of common geologic, soil, or water features; or (5) outstanding or unusual geologic, soil, or water features (43 CFR 8223 - Research Natural Areas).

The San Benito Mountain area was originally established as an Outstanding Natural Area (ONA) in 1972 because of the unique forest assemblage covering approximately 1,500 acres. In 1986, the BLM started fencing the boundaries of the ONA easily accessible to vehicle trespass (due to unauthorized OHV use). Continued unauthorized OHV use in the ONA, primarily on the sparsely vegetated or barren hillsides, adversely affects this unique environment and the values for which it was established.

The 1999 Record of Decision (ROD) for the CCMA Amendment to the Hollister RMP officially designated the 'Outstanding Natural Area' as the San Benito Mountain 'Research Natural Area' to encourage research and provide protection of the unique conifer forest on and around San Benito Mountain. The ROD (1999) also identified the need to expand the SBMRNA, which was completed in a 2006 ROD for CCMA RMP Amendment and Route Designation, and approved expansion of the boundary of the San Benito Mountain RNA to 4147 acres. Following the 2006 ROD, BLM completed additional fencing to protect the RNA values described below.

San Benito Mountain is the only place in the world that supports Jeffrey pine (*Pinus jeffreyi*), Coulter pine (*P. coulteri*), and foothill pine (*P. sabiniana*), and incense cedar (*Calocedrus decurrens*) at the same location. The San Benito Mountain population of Jeffrey pine is the only population of this species in the California Coast Range south of northern Lake County (Kuchler 1977, p. 151). As such, the Jeffrey x Coulter pine hybrids around San Benito Mountain are an important natural source of genetic combinations and have been used in the past for genetic research and breeding programs. The unique forest assemblage also contains groves of incense cedars, the only incense cedars in the inner central

California Coast Range. The nearest stands of incense cedars found elsewhere, are in the coastal Santa Lucia Mountains 60 miles to the west and in Napa County 175 miles to the north. The rare talus fritillary (*Fritillaria falcata*) occurs at only nine locations in the world and two of those, including the largest population, occur in the understory of the San Benito Mountain Forest. These distinctions emphasize the importance of the San Benito Mountain and conservation of the biodiversity represented by the unusual genetic and species assemblages of this Research Natural Area.

The BLM created the San Benito Mountain Research Natural Area to provide special resource management protection for this unique area with three management goals: 1) to ensure survival of the pine forests in the CCMA; 2) to maintain the vegetation and soil resources in as natural a condition as possible; and 3) to provide opportunities for scientific and academic research in this unique ecosystem.

Research and education conducted within the RNA includes programs and studies by the United States Forest Service, the United States Geological Service, the Natural Resource Conservation Service, the University of California Davis, University of California Merced, the California Native Plant Society, and The Audubon Society.

The SBMRNA contains sensitive resource values and riparian habitat, including populations of Federally threatened San Benito evening primrose (*Camissonia benitensis*) populations, serpentine barrens, and a unique forest assemblage of Jeffery pine, and other mixed-conifers. The boundaries are delineated using identifiable landmarks, to the extent possible, and reflect the most current BLM policies for management of the public lands.

Table 3.10-1 Serpentine ACEC Subunit Acres

Subunit	**Acres**
San Benito Mountain Wilderness Study Area	1,500
San Benito Mountain Research Natural Area	4,147
TOTAL	**4,147***

(*) RNA overlaps WSA

3.10.3.3 Wild and Scenic Rivers

A wild and scenic river inventory was prepared by the HFO during development of the CCMA Draft RMP/EIS to determine eligibility and suitability of rivers in CCMA to be included in the NWSRS. Though most river and stream segments on public lands in CCMA were found to be eligible, none were deemed to be suitable for addition to the NWSRS (see Appendix VI).

3.10.3.4 San Benito Mountain Wilderness Study Area (WSA)

Under the Federal Land Policy and Management Act (FLPMA) of 1976, the BLM was mandated to study all public lands for wilderness potential. The results of the wilderness inventory in California and a general description of all WSAs in the state was published in BLM's California Statewide Wilderness Study Report (BLM 1990). Those not meeting certain wilderness criteria could be dropped from further wilderness study. However, all existing designated Natural Areas were automatically put in the wilderness study category, and could not be dropped from further wilderness review except by Congress.

All WSAs are managed in accordance with the Interim Policy of Lands Under Wilderness Review. Therefore, the Wilderness Study Area will continue to be managed subject to the BLM's Interim Management Policy (IMP) for lands under wilderness review until Congress makes a determination as to the area's suitability for wilderness designation.

While Congress considers whether to designate a WSA as permanent wilderness, the BLM manages the WSA in a manner as to prevent impairment of the area's suitability for wilderness designation.

On July 29, 1971, the Director of the Bureau of Land Management officially designated the San Benito Mountain Natural Area. The San Benito Wilderness Study Area (CA-040-309) designation covers 1,500 acres within the CCMA.

The *California Statewide Wilderness Study Report* (BLM 1990) final intensive inventory Map 04-L shows everything that was inventoried by the Hollister Field Office, including the San Benito Mountain Natural Area/Instant Study Area. The San Benito Mountain Natural Area/Instant Study Area Wilderness Report is linked on the following webpage:

http://www.blm.gov/ca/pa/wilderness/wilderness_pdfs/wilderness_study_reports/sanbenitomountain.pdf

This report includes the CCMA portion of Map 04-L and says, "*The San Benito Mountain Natural Area consists of many negative impacts by man, the· resultant damage being irreversible. Mans previous activities such as road building, mining, timber harvesting and manmade structures are too numerous and highly visible."* The report also includes a w*ilderness characteristics review* of other contiguous public lands in the CCMA *that states, "Additional BLM Administered lands contiguous with the Natural Area were identified in February 1979 as not possessing wilderness characteristics."*

As a result, the BLM's wilderness report linked above concluded that the San Benito Mountain Natural Area/Instant Study Area is not suitable for wilderness based on size (1500 ac.) and the impacts of man "*even when considered with contiguous public lands outside the Natural Area."* If the 1,500-acre area is released from WSA status by Congress, it would be managed consistent with the goals and objectives and the resource management actions for the Serpentine ACEC and the San Benito Mountain RNA described in this RMP/EIS.

3.10.3.5 Lands with Wilderness Characteristics

The HFO has acquired lands since the completion of the 1984 Hollister RMP and the initial wilderness review per FLPMA. These lands were acquired primarily for the conservation of special status species or to improve management efficiency.

Pursuant to IM 2011-154, BLM inventoried public lands throughout the CCMA for wilderness characteristics. Based on the acquisition of lands since the original inventory, BLM determined the public lands in between the Cantua drainage and Joaquin Ridge comprise approximately 5,070 acres with wilderness characteristics in the CCMA. The area borders the Serpentine ACEC boundary to the southwest, the San Carlos Bolsa to the northwest, BLM public lands to the north and Joaquin Ridge to the east/southeast. Coalinga is the closest town approximately 30 miles to the south.

These public lands are located west of the San Joaquin Valley in the Diablo Mountains and include very steep, rugged terrain accentuated by intermittent drainages. An over flight was conducted on April 14, 2011 and a series of aerial photos were taken to document the natural state of the area.

Only one route lies within this area, BLM designated Limited Use T189. This route is a narrow route with an ATV RMO (48" wide). Since the emergency closure of CCMA in 2008, this route has already re-

vegetated about 50%. It is likely it would be almost completely returned to natural conditions without further interference within 10 years. No structures were observed within the inventory area. Overall, human impacts are almost non-existent within the area with outstanding opportunities for solitude as well as primitive and unconfined recreation.

The repeater towers on San Carlos and San Benito peaks are visible from several ridges within the inventoried area. However, they are not within the view shed throughout the rest of the area.

A. Wilderness Characteristics Inventory

1. Naturalness: The inventoried area has retained a high degree of natural character. The unit is characterized by steep, rugged terrain dissected by several deep drainages with slopes averaging 30 to 50 percent. Vegetation of the area is predominately chaparral, Mediterranean annual grasses along with forbs and low shrubs, with juniper, pine, oak and yucca occurring at higher elevations.

The unit remains relatively free from human influence. Some OHV tracks and exploratory mining pits occur within the area. These improvements and ways do not detract significantly from the naturalness of the area.

2. Solitude: The rugged terrain, the steep canyons and associated drainages provide outstanding opportunities for solitude. This opportunity is less near the south western perimeter due to roads, communication towers, and/or views of surrounding homes. This area is periodically over flown by military and law enforcement aircraft as part of the national defense mission taking place in approved military operating areas and flight corridors, as well as part of ongoing anti-drug operations. The visual intrusions and associated noise create periodic temporary effects on solitude which are deemed necessary and acceptable as a part of the defense preparedness of the nation.

3. Primitive and unconfined recreation: The area provides good opportunities for primitive and unconfined recreational pursuits common to an oak woodland/chaparral community in steep, rugged terrain. These include hunting, hiking, and bird-watching. Annual game bird, wild pig and deer populations vary greatly from year to year with hunting activity varying accordingly. Extreme daytime summer temperatures restrict recreational opportunities during the dry season. Streams are ephemeral.

4. Special features: High potential for prehistoric and historic archaeological resources in the area that are likely in good condition due to remoteness of the location. Raptor nesting also occurs in the cliffs overlooking the steeper canyons.

3.11 Livestock Grazing

3.11.1 Introduction

The CCMA grazing lands have a Mediterranean-type climate, with cool, moist winters and hot, dry summers. Ninety percent of the precipitation (approximately 17 inches) comes during the late fall, winter, and early spring. The growth of forage grass begins with the first fall rains, and dormancy occurs in the late spring with soil water depletion.

Forage production for livestock consumption is a historic land use in the Planning Area. The Hollister RMP, as amended, authorizes 1,354 animal unit months (AUMs), which are leased for grazing on 22,140 acres of BLM-administered lands on 14 grazing allotments that are within portions of CCMA and the Serpentine ACEC. All of these lands consist of mixed chaparral and oak woodland vegetation types, as well as annual grasslands and half-shrub vegetation. Forage production, currently for cattle only, consists primarily of annual grasses and forbs that grow during the winter and spring, when the weather is cool and wet. Yearlong grazing is common on many allotments. Key aspects of managing annual grasslands for livestock production are maintenance of residual dry matter and appropriate season of use.

Map 9 in Appendix I identifies existing grazing allotments in the Planning Area.

3.11.2 Regulatory Framework

Vegetation consists mainly of annual grasslands, chaparral, chamise, and oak savannah. Annual grasses are the important livestock forage. The HFO Planning Area currently consists of four management areas (MAs) categorized according to common features, resource issues, or management needs.

The BLM administers it grazing program in California and in the other western States under 43 CFR 4100. These regulations implement the laws that govern public land grazing, including the Taylor Grazing, Federal Land Policy and Management Act, and Public Rangelands Improvement Act.

The Taylor Grazing Act of 1934 authorizes BLM administration of livestock grazing on public lands. Currently, the 1984 Hollister RMP provides specific guidance for livestock grazing within the Planning Area. In accordance with 43 CFR 4180.2, the Central California Rangeland Health Standards and Guidelines for Livestock Grazing Management was approved on July 13, 2000. The standards establish four fundamentals for managing rangelands including soils, species, riparian, and water quality (see subsection 3.11.4). Specific indicators of rangeland health determine whether these standards are being met within a grazing allotment, and appropriate management corrective action is required if one or more of the standards are not being met. The grazing guidelines consist of 18 specific items that provide direction for grazing management. The standards describe the conditions needed to promote and sustain rangeland heath and apply to all land uses in addition to grazing.

The 1978 Public Range Improvements Act established a national policy and commitment to improve conditions on public rangelands. The Act requires a national rangeland inventory, consistent federal management policies, and provides funds for range improvement projects. It also amends the Wild Free-Roaming Horses and Burros Act and the Federal Land Policy and Management Act of 1976.

The 1984 Hollister RMP, as amended provides current direction for livestock grazing management. The RMP calls for management action to improve forage production and animal distribution throughout the allotments. Livestock forage is allocated for grazing only in suitable areas. These acres are managed to maintain between 500 and 1,000 pounds of mulch per acre at the end of the grazing season. The grazing season is determined based on impacts on other resources. All livestock watering developments are

available and safe for wildlife use. Prescribed fire to improve forage production is considered on a case-by-case basis. Livestock use of burned areas is determined by monitoring.

3.11.3 Regional Setting

The 1984 Hollister RMP stated "resource production on public lands is not significant in relation to the overall economy" (BLM 1984). However, a few industries and individuals are economically dependent on public lands. For example, 11 livestock operations, or 91 percent of the lessees in the Planning Area, are dependent on public lands for more than 10 percent of their forage needs.

The overall pattern of livestock production in California is similar to the pattern on HFO public lands. In 1992 California supported 22,700 livestock operations, which had a total inventory of over 5.5 million cattle and sheep. During the preceding years from 1987–1992, the number of beef cattle and sheep operations decreased 14 percent and 20 percent, respectively. While the numbers of sheep have decreased on sheep operations, the opposite is true for numbers of cattle, which have increased on cattle operations. The decrease in the number of cattle ranches coupled with an increase in the number of cattle has been a consistent trend for the past 30 years.

3.11.4 Current Conditions and Trends

Livestock grazing occurs on 14 grazing allotments with boundaries in and around CCMA, comprising a total of 57,633 acres of BLM-administered lands located in southern San Benito and western Fresno counties. These allotments are identified in Table 3.11-1 and on Map 9 in Appendix I.

Currently, 7,547 AUMs are leased on these fourteen grazing allotments, which include portions of CCMA and the Serpentine ACEC. Table 2.4-7 in Chapter 2 identifies the number of acres and AUMs for each grazing allotment. Based on management status, most of the grazing allotments need improvement and the balance require custodial or maintenance. These grazing allotments have been assessed for compliance with the Central California for Rangeland Health Standards and Guidelines for Livestock Grazing Management (see Table 3.11-1). The standards for rangeland health and guidelines for livestock management on BLM lands are written to accomplish the four fundamentals of rangeland health, insofar as the standards are affected by livestock grazing practices. The fundamentals are:

- Watersheds are properly functioning;
- Ecological processes are in order;
- Water Quality complies with State standards; and,
- Habitats of protected species are in order.

A "standard" is the criterion to determine whether management actions are resulting in the maintenance or attainment of rangeland health. The standards are expressions of physical and biological conditions or degree of function required for healthy, sustainable rangelands. The allotments are classified into one of four categories depending on the results of the rangeland health surveys: Category 1 allotments are those that do not meet one or more of the standards and livestock grazing is the cause; Category 2 allotments are those that do meet all of the standards; Category 3 allotments do not meet one or more of the standards and the cause is unknown; and Category 4 allotments do not meet one or more of the standards and livestock is not the cause.

Twenty-nine percent of the grazing allotments (or 4 allotments) meet all four rangeland health standards (see Table 3.11-1). Seventy-one percent (or 10 allotments) are not in compliance with one or more of the

standards, and the cause is attributed to water quality or species diversity, where it has been determined that livestock grazing is not the cause. The water quality issues result from high levels of trace metals, and mercury, which are transported into surface water and groundwater after road cuts and flood events. Allotments with species diversity issues are dominated by decaying chamise and chaparral vegetation. Fire exclusion has prevented mixed age-class stands, which would provide plant diversity. No allotments fail to meet the standards with the cause not known.

Table 3.11-1 Grazing Allotment Evaluations with Regards to the Central California Rangeland Health Standards and Guidelines

Allotment Name	Standard Class[1]	Rangeland Health Standards
Adobe	4	Water Quality
Akers	4	Water Quality, Species Diversity
Ashurst Ranch	4	Water Quality
Bar B Ranch	4	Species Diversity
Birdwell	2	NA
Diamond A	4	Water Quality
Goat Mountain	4	Water Quality, Species Diversity
Hernandez	4	Species Diversity
Joaquin Rocks	2	NA
Lewis Flat	2	NA
Quarter Circle	4	Species Diversity
Upper Los Gatos Creek	4	Water Quality, Species Diversity
Williamson	4	Water Quality, Species Diversity
Willow Spring	2	NA

Key[1:] Standard Class: 1 = Not meeting standards and livestock is the cause; 2 = Meeting standards; 3 = Not meeting standards and cause unknown; 4 = Not meeting standards and livestock is not the cause.

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3.12 Energy and Minerals

3.12.1 Introduction

This section addresses mineral resource exploration, development, and production on federal mineral estate in the CCMA. The history of exploration, extraction and production of industrial minerals has occurred in this region since the mid-1850's. There have been four main mineral commodities of economic importance; mercury, chromite, asbestos and benitoite. All of these minerals occur on federal land, however the benitoite discovery (Gem Mine) was later patented to private fee land.

Within the CCMA there are 66 historic abandoned mines on public land, which produced four mineral commodities, asbestos (18), chromite (19), mercury (25) and magnesite (3).

Of these economic minerals that were produced over the last 150 years, mercury had the longest production period, from the New Idria mine (1857-1972). The major mercury production was ended when the New Idria mine closed in 1972 this mine produced 38,250,000 pounds of mercury over a period of 115 years . Besides the New Idria mine, at one time there were 24 other small mercury deposits that were sporadically productive in the CCMA.

3.12.2 Regulatory Framework

The 1920 Mineral Leasing Act governs the leasing of oil and gas lands and applies to all federally owned minerals. The Mineral Leasing Act provides that all of these lands are open to oil and gas leasing unless a specific order has been issued to close the area to leasing.

BLM holds lease sales of the oil and gas resources in accordance with the Federal Onshore Oil and Gas Leasing Reform Act (FOOGLRA). Subject to the stipulations outlined in this Plan and standard terms and conditions, an oil and gas lease gives the lessee the right to extract the resource and to occupy the appropriate size area necessary for extraction. The lessee may conduct any activities necessary to develop and produce natural gas from the lease area, including drilling wells, building roads, and constructing pipelines and related facilities. Although the initial lease term is 10 years, it may be extended indefinitely as long as the lessee demonstrates that the lease is capable of producing oil or gas in paying quantities. Extended leases are considered "held by production." Unleased parcels, or parcels for which the term has expired without development, may be requested by industry for inclusion in a new lease sale.

The California Division of Oil, Gas and Geothermal Resources oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells. Applicable regulations include California Public Resources Code, Division 3, which governs the regulation of oil and gas operations; and California Code of Regulations Title 14, Division 2, Chapter 4: Development, Regulation, and Conservation of Oil and Gas Resources.

3.12.3 Regional Setting

Historically, the region was known as the New Idria Mining district. The New Idria Quicksilver Mining Company began mining cinnabar and mercury from the region in 1854. Other materials such as asbestos, magnesite, nickel, and chromium were also extracted (USDI 2005). Mining of asbestos began in the 1950's and the last active asbestos mine in the U.S. was the KCAC asbestos mine.

In general, the region was an active mining and ore processing area for over a century. Many of the abandoned mercury mines were left to erode and degrade surface waters. BLM started an active Abandoned Mine Land program in the late 1990's. A summary of BLM's efforts to restore water quality

by restoration of abandoned mercury mines is included in Section 3.2.3.3. In 2004, the Regional Water Quality Control Board issued a Total Maximum Daily Load (TMDL) for mercury in the CCMA.

There are two active oil and gas fields in southern San Benito and western Fresno counties. However, no new exploration wells have been drilled on BLM lands in the region in over 20 years. New geophysical exploration activity in the Vallecitos Valley was conducted in 2008, suggesting more wells could be drilled in this area as demand for these resources increases. New exploration drilling activity would include the construction of some associated roads and facilities, and pipelines installed to existing infrastructure.

Exploratory oil wells have been drilled on less than 5 percent of the leases issued on BLM public lands, and only one of every 15 to 20 exploratory wells actually results in the discovery of oil. As a result, there is currently no oil and gas production within the Planning Area. The nearest production comes from oil fields near Coalinga and the Vallecitos Valley.

Refer to BLM's Reasonably Foreseeable Development Scenario (2005) in Appendix VIII for more information on potential oil and gas developments on CCMA public lands.

3.12.4 Current Conditions and Trends

Since 1999, BLM has remediated many of these old abandoned mercury mines, since mercury sediment contaminated surface water and due to a State of California limit of the amount of mercury that can be discharged into Clear Creek (TMDL. 2004). Further, in 2010, the New Idria is being evaluated by the EPA for inclusion into the Superfund program for possible future remediation (EPA, 2010).

Asbestos mining also had a brief boom during the 1950's at one time the Clear Creek area had 18 asbestos mines on public land. Of these mines, two mines are notable, Atlas Mine became a Superfund site in 1984, and the Johns-Manville or KCAC mine, the last active asbestos mine in the U.S.

Chromite was also produced in the area during the mid-1950's and there were 19 chromite mines on public lands that were productive for a few years (1945-1958). However the production of chromite in the CCMA was not very high, approximately 30,000 tons have been produced from these mines (EPA, 1988). The chromite deposits in the CCMA are not regarded as to be of a commercial grade (Fowkes, 2003).

Over the years, federal mining claims in the CCMA have seen a dramatic spike, from the time period 1970-1988, there were over 868 individual claims that had been filed. However, more than 90% of these mining claims were closed after the first year. The only remaining active mining claims were for casual use hobby gem and mineral collection. From 1990-2010, less than 20 mining claims were filed and remained active for casual use collection of hobby gems and minerals.

ECONOMIC MINERALS OF IMPORTANCE

In the Clear Creek Management Area, there were only four historic industrial minerals produced in the last 100 years, asbestos chromite, magnesite, mercury. Of these minerals only chromite is included on the U.S. National Defense Stockpile list for critical and strategic minerals that would be needed in times of a national emergency. Due to the dynamic economic and political world setting, annual adjustments are made to the National Defense Stockpile. From 1987 to 1999, sales of excess stockpile inventories reduced the value of these from $10.1 billion to $3.4 billion (GAO, 2001).

Chromite consumption of the U.S. is about 14% of all the chromite mined globally each year. There is no chromite production in the U.S. and 80% of the global chromite production comes from Turkey,

Kazakhstan and southern Africa. The world reserves for chromite are estimated at over 11 billion tons which would easily meet demand for hundreds of years (Mineral Information Institute, 2010).

In the U.S. there are two major chromite deposits that may have future commercial importance. In Montana, the Stillwater complex is thought to host 80% of the chromite reserves in the U.S. (Chrome Mountain, 2010). In 1986-1987, the Chrome Corporation produced 132,000 tons of chromite ore at this Montana mine, but the mining ceased due to inadequate funds and low commodity prices.

In 2010, a Coos Bay, Oregon company proposed to open pit chromite beach sand mine. A mining plan has been submitted for development and is pending regulatory permitting approved for mining this deposit. According to a company news release, Oregon Resources Corporation has stated that 130,000 tons of finished chromite ore could be sold annually. Of this amount the expected market was 30% for domestic use, 30% for Europe, and the remained would go to China, and Australia.

The only active mining on or immediately adjacent to BLM-administered land in the CCMA is for unique minerals and gemstones (benitoite). Since the 1984 Hollister RMP was prepared, mining claims in the CCMA have been limited to approximately 12 small claims for casual use mineral collection. Casual use means that no mechanized equipment is used and the disturbance is limited in size to less than 1 acre.

Based on the BLM's Reasonably Foreseeable Development Scenario (2005) in Appendix VIII, the hydrocarbon mineral potential for oil and gas in the Serpentine ACEC is classified as 'none' due to the serpentine rocks present. However, the other management zones within the CCMA boundary do contain sedimentary formations that could be suitable for hydrocarbon production and are classified as 'moderate'.

Overall, the CCMA has moderate potential for mineral development. The New Idria serpentine mass (ACEC) is highly-mineralized and was historically, commercially mined for magnesite, chromite, cinnabar, and asbestos. The Gem mine, a privately-owned inholding within the CCMA, continues to mine and market benitoite. Most other mineral development within the CCMA has ceased due to depletion of near-surface marketable minerals and changing mineral markets and mineral regulation (i.e. asbestos ban in U.S.). The CCMA has moderate potential for energy development. Oil and gas development potential is very low as the New Idria serpentine mass (ACEC) which comprises 40% of the CCMA land area has no potential for fossil fuel resources. The remainder of the CCMA contains sedimentary formations which have not yielded significant oil and gas resources within the local area. Wind energy development has some potential as the CCMA contains some of the highest points in the Diablo Range.

Remediation efforts at the KCAC mine are still underway, and are being monitored by BLM, San Benito County, and the State of California under the 1976 SMARA regulations. There are many other abandoned mines and prospects for mercury, of which BLM has undertaken remediation to reduce the transport of contaminated sediment from impacting CCMA watershed values. Abandoned mine lands that have been remediated include the Atlas Superfund Site, Aurora, Jade Mill, Alpine, Xanadu, Larious Canyon, Archer, and multiple unnamed retort piles adjacent to Clear Creek. Refer to Hazardous Materials and Public Health and Safety, Section 3.2 for more information on abandoned mine lands in CCMA.

To summarize, industrial mineral production in the CCMA has been episodic and tied to high commodity prices. Historic production of asbestos and mercury is not expected to be re-activated due to stricter environmental regulatory permitting. Chromite mining could be re-activated if ore prices rise to offset permitting and production costs. However, due to the current chromite market, huge world reserves and ample supply, it is unlikely that the future chromite prices would spike enough to make any new mining in California and in the CCMA economic. Further, the chromite deposits in the CCMA are not considered to be of commercial grade (Fowkes, 2003).

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3.13 Cultural Resources

3.13.1 Introduction

Cultural resources are the dynamic interplay between people and their environment expressed on the landscape. The term "cultural resources" can apply to a wide array of different "things," from historic archeological sites to contemporary plant collection areas. Other examples of cultural resources include sacred places, monuments, Native American cultural items, historic objects or buildings, religious or traditional practices, and historical documents (King 1998:7-9). Nevertheless, archeological sites are the most common type of cultural resource encountered on BM public lands.

Most archeological sites are complex, containing diverse components, each of which may represent a different activity, time period, or even both. Artifacts are objects manufactured by hand or machine, such as: pottery bowls, porcelain plates, metal hinges, glass bottles, shell beads, stone projectile points, and groundstone bowls. Features are immovable manufactured objects, larger than artifacts (such as buildings). Features often contain artifacts or have artifacts associated with them. One of the values of archeological sites lies in the information that sites contain and the knowledge that can be gained from their study - the ability of a site's information to be used in answering important questions about the past.

Archeological sites may also possess traditional cultural values, ascribed by a community, ethnic group, or Indian tribe to archeological sites and other places associated with its cultural practices or beliefs that are rooted in the community's history and are important in maintaining the continuing cultural identity of the community. These kinds of sites are important for economic, artistic, or other cultural practices in maintaining a group's cultural/historical identity. Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values are often vital to maintaining the group's sense of identity and self-respect. Archeological sites to which traditional cultural values are ascribed can take on vital significance, so any damage to or infringement upon them is deeply offensive to the group that values them.

BLM management of cultural resources utilizes an integrated system of identifying and evaluating cultural resources, deciding on their appropriate uses, and administering them accordingly, both on public lands and in areas of BLM decision-making responsibility. An important goal for the BLM is to address the needs of Native Americans' access to and unhampered use of places of traditional cultural or religious importance, including non-commercial collection of natural resources for traditional purposes. Public demand for places to visit and learn from cultural properties, such as interpretive development, should also be considered.

3.13.2 Regulatory Framework

3.13.2.1 Archeological and Historic Sites

The following federal laws and regulations are applicable to cultural (prehistoric and historic archeological) resources:

Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 432, 433), is chronologically and philosophically the basic legislation for the protection and preservation of cultural properties (archeological and historic, without regard to minimum age) on Federal lands. It provides for permits to authorize scholarly use of properties, for misdemeanor-level penalties to control unauthorized use, and for presidential designation of outstanding properties as national monuments for long-term preservation. The act is implemented by uniform regulations at 43 CFR Part 3. Both broader in scope than and superseded

in part by the Archeological Resources Protection Act, it remains a fully active statutory authority.

Recreation and Public Purposes Act of 1926 (P.L. 69-386; 44 Stat. 741; 43 U.S.C. 869) authorizes the lease or sale of historic properties under certain conditions. (See 43 CFR 2741 and BLM Manual Section 2740.)

Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666; 16 U.S.C. 461) declares national policy to identify and preserve "historic sites, buildings, objects and antiquities" of national significance, authorizing the National Historic Landmarks program of the National Park Service and providing a foundation for the later National Register of Historic Places. Regulations implementing the Landmarks program are at 36 CFR 65.

Reservoir Salvage Act of 1960, as amended by Archeological and Historic Preservation Act of 1974 (P.L. 86-523; 74 Stat. 220, 221; 16 U.S.C. 469; P.L. 93-291; 88 Stat. 174; 16 U.S.C. 469) provides for the preservation of historical and archaeological data that might otherwise be lost as the result of a Federal construction project or a federally licensed or assisted project, activity, or program having an effect on cultural resources. Although amended and broadened after 1966, the act makes no distinction regarding National Register eligibility. The act provides that up to one percent (1%) of funds the Congress authorizes to be appropriated for a project may be spent to recover, preserve, and protect archeological and historical data. BLM projects are rarely subject to line item authorization and appropriation; as such this provision generally does not apply to BLM.

Wilderness Act of 1964 (P.L. 88-577, 16 U.S.C. 1131) established a National Wilderness Preservation System for values to be "protected and managed so as to preserve its natural conditions and which…may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value."

National Historic Preservation Act of 1966 (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470), as amended, extends the policy in the Historic Sites Act to include State and local as well as national significance, expands the National Register of Historic Places, and establishes the Advisory Council on Historic Preservation, State Historic Preservation Officers, Tribal Preservation Officers, and a preservation grants-in-aid program. Section 106 directs all Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the National Register of Historic Places, and Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 110(c) requires each Federal agency to designate a Preservation Officer to coordinate activities under the act. Section 106 of the act is implemented by regulations of the Advisory Council on Historic Preservation, 36 CFR 800. The 10 Western BLM States and Alaska comply with Section 106 of the Act according to a national Programmatic Agreement (PA) dated March 26, 1997.

National Trails System Act of 1968 (P.L. 90-543; 16 U.S.C. 1241 et. seq. as amended through P.L. 107-325, December 4, 2002) established a national trails system to promote preservation of, public access to, travel within, and enjoyment of the open-air, outdoor areas, and historic resources of the nation. The act designated initial trail system components and established methods and standards for adding additional components. Trails are added to the system only by act of Congress. Historic Trails, trail sites, and trail segments must be evaluated against the National Register criteria at 36 CFR 60, whether congressionally designated or not, to determine National Register eligibility and responsibilities related to Section 106 of the National Historic Preservation Act.

National Environmental Policy Act of 1969 (P.L. 91-190; 83 Stat. 852; 42 U.S.C. 4321) establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal Government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." The act is implemented by regulations of the Council on Environmental

Quality, 40 CFR 1500-1508.

Executive Order 11593 ("Protection and Enhancement of the Cultural Environment," 36 F.R. 8921, May 13, 1971) directs Federal agencies to inventory cultural properties under their jurisdiction, to nominate to the National Register of Historic Places all federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and also to assure that Federal plans and programs contribute to preservation and enhancement of non-federally owned properties. Some of the provisions of the Executive Order are also found in Section 110 of the National Historic Preservation Act.

Federal Land Policy and Management Act of 1976 (P.L. 94-579; 90 Stat. 2743; 43 U.S.C. 1701; "FLPMA") directs the BLM to manage public lands on the basis of multiple use, in a manner that "recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands" and that will "protect the quality of . . . historical . . . resources, and archeological values." The act provides for the periodic inventory of public lands and resources, for long-range, comprehensive land use planning, for permits to regulate use of the public lands, and for the enforcement of public land laws and regulations. FLPMA is the primary basis for managing cultural resources on the public lands.

Archeological Resources Protection Act of 1979 (P.L. 96-95; 93 Stat. 721; 16 U.S.C. 47Oaa et seq.) as amended (P.L. 100-555; P.L. 100-588) provides felony-level penalties, more severe than those of the Antiquities Act of 1906, for the unauthorized excavation, removal, damage, alteration, defacement, or the attempted unauthorized removal, damage, alteration, or defacement of any archeological resource, more than 100 years of age, found on public lands or Indian lands. The act also prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archeological resource obtained from public lands or Indian lands in violation of any provision, rule, regulation, ordinance, or permit under the act, or under any Federal, State, or local law. No distinction is made regarding National Register eligibility. The act establishes definitions, permit requirements, and criminal and civil penalties, among other provisions, to correct legal gaps and deficiencies in the Antiquities Act. The act overlaps with and partially supersedes the Antiquities Act. It is implemented by uniform regulations and departmental regulations, both at 43 CFR 7. An amendment in 1988 gives Federal agencies explicit direction to establish educational programs explaining the importance of archeology, to help members of the public understand why archaeological resources are protected from unauthorized removal or damage.

Executive Order 13287 ("Preserve America" 68 F.R. 43, March 5, 2003) orders the Federal government to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. The order establishes new accountability for agencies with regard to inventories and stewardship.

3.13.2.2 Native American Values

The following federal laws and regulations are applicable to cultural (contemporary Native American traditional use) resources:

American Indian Religious Freedom Act of 1978 (P.L. 95-431; 92 Stat. 469; 42 U.S.C. 1996) resolves that it shall be the policy of the United States to protect and preserve for the American Indian, Eskimo, Aleut, and Native Hawaiian the inherent right of freedom to believe, express, and exercise their traditional religions, including but not limited to access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonials and traditional rites. Federal agencies are directed to evaluate their policies and procedures to determine if changes are needed to ensure that such rights and freedoms are not disrupted by agency practices. The act, a specific expression of First Amendment guarantees of religious freedom, is not implemented by regulations.

Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601; 104 Stat. 3048; 25 U.S.C. 3001) establishes rights of Indian tribes and Native Hawaiian organizations to claim ownership of certain "cultural items," including human remains, funerary objects, sacred objects, and objects of cultural patrimony held or controlled by Federal agencies and museums that receive Federal funds. The act requires agencies and museums to identify holdings of such remains and objects and to work with appropriate Native American groups toward their repatriation. Permits for the excavation and/or removal of "cultural items" protected by the act require Native American consultation, as do discoveries of "cultural items" made during land use activities. The Secretary of the Interior's implementing regulations are at 43 CFR 10.

Religious Freedom Restoration Act of 1993 (P.L. 103-141) establishes that the Federal government shall not substantially burden a person's exercise of religion even if the burden results from a rule of general applicability, except as provided in (1) furtherance of a compelling governmental interest; and (2) is the least restrictive means of furthering that compelling governmental interest.

Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" 59 F.R. 7629, February 11, 1994) orders the Federal government that each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands.

Executive Order 13007 ("Indian Sacred Sites" 61 F.R. 104, May 24, 1996) provides that in managing Federal lands, agencies - to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions - shall accommodate Indian religious practitioners' access to and ceremonial use of Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of sacred sites. The responsibility to identify such sacred sites to the managing agency resides with the Indian tribe or appropriately authoritative representative of an Indian religion. The responsibility to inform tribes, where practicable and appropriate, of proposed actions or land management policies that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites, rests with the agency. The order directs agencies to comply with the Executive Memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments." It explicitly does not create any new right or benefit for Indian tribes, nor any new trust responsibility for the Federal Government.

Executive Order 13084 ("Consultation and Coordination with Tribal Governments" F.R. Doc. 98-13553, May 14, 1998) orders the Federal government to establish regular and meaningful consultation and collaboration with Indian tribal governments in the development of regulatory practices on Federal matters that significantly or uniquely affect their communities; to reduce the imposition of unfunded mandates upon Indian tribal governments; and to streamline the application process for and increase the availability of waivers to Indian tribal governments.

Executive Order 13175 ("Consultation and Coordination with Tribal Governments" F.R. Doc. 00-29003, November 8, 2000) orders the Federal government to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Interagency Traditional Gathering Policy of 2006 is to promote consistency between the U.S. Forest Service Pacific Southwest Region and BLM California in support of traditional gathering of culturally

utilized plants. This policy also emphasizes local collaboration, implementation, and issue resolution between the agencies and Tribes, tribal communities, and traditional practitioners.

3.13.2.3 Statewide Protocol Agreement

The California Bureau of Land Management (BLM) utilizes a Programmatic Agreement (PA) approved in 1998 for cultural resources management. This PA was revised in 2004 and recently renewed in 2007. The PA is tiered to a national Programmatic Agreement (nPA) approved 1997 between the Advisory Council on Historic Preservation (ACHP), the Bureau of Land Management (BLM) and the National Council of State Historic Preservation Officers.

Signatories to the Statewide Protocol Agreement in California are the California BLM, the California State Historic Preservation Officer and the Nevada State Historic Preservation Officer. It is designed for the California BLM to "integrate its historic preservation planning and management decisions with other policy and program requirements to the maximum feasible extent in the public interest."

The Statewide Protocol Agreement meets Section 106 requirements of the National Historic Preservation Act (NHPA) to "take into account the effects of the agency's undertaking on properties included in or eligible for the National Register of Historic Places" as cited in 36 CFR 800.1(a). The PA also provides for an enhanced level of consultation between BLM, Federally recognized tribal governments, and non-federally recognized Native American groups as well.

3.13.3 Regional Setting

Some of the following background material is revisited from the Proposed Resource Management Plan / Final Environmental Impact Statement for the Southern Diablo Mountain Range and Central Coast of California for the Hollister Field Office (2007). The text has been condensed, edited, and significantly augmented in certain sections to reflect specific information about the Planning Area for this RMP/EIS.

3.13.3.1 Prehistoric Record

Coastal Influences

To begin, there are gaps in our knowledge of how Native American tribes that lived along the immediate coast articulated with those that lived in the interior portions on central California. Most culture-historical reconstructions for this region are predicated mainly on archeological data from the coastal strip, and the extent to which these trends or patterns parallel developments further inland remains largely undetermined. Archeologists surely recognize many of these shortcomings, but limited project development in the rugged interior of the South Coast Ranges has contributed little actual research. More focused research in the interior valleys will be necessary to flesh out the changing character of coastal-interior interaction over the last 10,000 or so years of human prehistory.

Archeological patterns in the Monterey Bay area have emerged mainly in the last two decades based on work by, among others, Dietz and Jackson (1981), Dietz et al. (1988), Cartier (1993a, 1993b), and Breschini and Haversat (1989). The earliest cultural remains in this area derive from the Scotts Valley site (CA-SCr-177), where occupation may have initiated as early as 13,500 BP. Cartier (1993a) has proposed three phases for the pre-8,500 BP interval (Aruama (13,500 to 11,500 BP), San Lorenzo (11,000 to 10,000 BP), and Umunhum (9,600 to 8,500 BP) based on superpositioning and slight shifts in assemblage composition. The two earliest phases are marked by numerous flake tools, small leaf-shaped and medium lanceolate projectile points or bifaces, battered cobbles, and ochre; limited core tools first appear during the San Lorenzo Phase. Artifacts attributed to the Umunhum Phase show apparent linkages to the San Dieguito Complex of southern California, including an eccentric crescent, bipointed

points/bifaces, refined flake tools, cobble-core implements, and heavy use of coarse-grained toolstone materials; small numbers of milling tools are also associated with this component, traits absent from the conventional San Dieguito definition. Similar materials have been reported from CA-Mnt-229 (Jones and Jones 1992), but the nature of these early occupations is still open to serious debate. Sites dated to the Millingstone Period are more common in the Monterey area, though only CA-SCl-178 in the interior contained large numbers of plant processing implements. That assemblages consonant with Encinitas Tradition (Warren 1968) complexes in southern California exist in this region is no longer open to question, but it remains unclear whether they reflect a consistently old cultural pattern.

The Early Period, exemplified in materials from CA-Mnt-391 (Cartier 1993b), is characterized by thick rectangular (Class L), end-ground (B), and split (C) *Olivella* beads, *Haliotis* square beads, contracting-stem and side-notched points, and both mortar/pestle and millingstone/handstone grinding technologies. Similar artifact assemblages are known from other Early Period components in the region (CA-SCr-239 (Cartier 1992), CA-Mnt-108 (Breschini and Haversat 1989), and CA-SCr-7 (Jones and Hildebrandt 1990)), but stratigraphic relationships are not so clear. The most important Middle Period sites in this area is CA-Mnt-229 (Dietz et al. 1988), where contracting-stem and side-notched points were recovered in association with *Olivella* saucer beads (G2 and G6 forms) and mortars and pestles; handstones and millingstones have been reported from Middle Period contexts at CA-SCr-9. Jones (1993) has observed that Late Period occupations in the Monterey area consist mainly of short term specialized processing stations that tend to be artifact-poor (Cf. Dietz and Jackson 1981). Excavations at CA-Mnt-1486/H (Breschini and Haversat 1992) led to identification of a Late Period component containing Desert Side-notched points, end-ground (B2 and B5), cupped (K1), and sequin (M1) *Olivella* beads, and *Haliotis* disks, together with mortars and pestles, handstones, earspools, and an imperforate plummet-shaped charmstone.

The many competing cultural sequences proposed for this region have confused attempts to bring order to the record, some researchers developing entire chronologies based on stratigraphic relationships at a single site and others drawing phase breaks on the basis of shifts in one or another artifact class. Attempting to bring some order to this issue, Jones (1993) has recently offered a general sequence of periods that might conceivably apply to a whole range of geographic situations; these periods can be further segregated into phase units where archaeological and temporal controls permit. Beginning with the Paleoindian period (ca. 11,000 to 8,500 BP), this sequence progresses through Millingstone (ca. 8,500 to 5,500 BP), Early (ca. 5,500 to 2,600 BP), Middle (ca. 2,600 to 1,000 BP), Late (ca. 1,000 to 500 BP), Protohistoric (ca. 500 BP to A.D. 1769), and Historic (post-A.D. 1769) periods. These general periods can be used to discuss cultural patterns in various sectors of the central coast region. Much of this information is drawn from Bouey and Basgall (1991) and Jones (1993).

Valley Influences and the Establishment of a Local Chronological Sequence

Over the last 60 years, the progress of archeological research along the western foothills of the San Joaquin Valley has fluctuated a great deal. Following the pioneering efforts of Schenck and Dawson (1929) and Hewes (1941), investigations slowed until the late 1960s and early 1970s when archeological activity reached a peak due to the construction of several large-scale water projects. Important contributions to regional prehistory came from the excavation of sites like CA-Fre-128 and CA-Fre-129 (Olsen and Payen 1968, 1969). Based on the results of these excavations, Olsen and Payen (1969) developed a local chronological sequence consisting of four cultural complexes known as the "San Luis – Little Panoche Chronology." Work by Bennyhoff and Hughes (1987) resulted in revisions of the typological system and the absolute ages assigned to important chronological indicators originally used by Olsen and Payen (1968, 1969). The revised Pacheco Pass sequence, as proposed by Mikkelsen and Hildebrandt (1990), is included in Table 3.13.3.1.A.

Table 3.13.3.1.A - Concordance of Regional Chronological Sequences

Years Before Present (BP)	Santa Clara County[1]	Central Coast[2]	Pacheco Pass[3]
0	Historic Late 2 Late 1	Historic Protohistoric Late Middle-Late Transition	 Panoche Gonzaga
1,000	Middle-Late Transition	--	--
2,000	Middle	Middle	Pacheco A
3,000	Early	--	Pacheco B
4,000	--	Early	--
5,000	Millingstone	--	Positas
6,000	--	Millingstone	--

Notes: [1] Milliken and Bennyhoff (1993), [2] Jones (1993), [3] Mikkelsen and Hildebrandt (1990, 1993).

Earliest evidence of occupation is termed the Positas Complex (approximately 4,500 to 5,200 BP). Lacking burials and structures, it is represented by a component at the base of CA-Mer-94 and appears to include perforated flat cobbles or "doughnut stones," flake scrapers, shaped mortars, short cylindrical pestles, millingslabs and handstones, small scraper planes, spire-lopped *Olivella* beads, and perforated pebble pendants. Rather, it was thought that the presence of "doughnut stones" or "cog-stones" may indicate a tentative connection to the south coast.

The succeeding Pacheco Complex has been tentatively divided into two phases. The earliest, Pacheco Complex B (2,500 to 4,500 BP), is poorly documented and only marginally represented at one site – CA-Mer-94. Material culture includes thick, rectangular *Olivella* beads, rectangular *Haliotis* or freshwater mussel beads, large leaf-shaped projectile points, a minor amount of milling equipment, and the questionable presence of two or three flexed burials. This artifact assemblage is indicative of an Early Period presence.

The Pacheco A Complex (approximately 1,000 to 2,500 BP) is better represented at archeological site CA-Mer-94 and less so at CA-Mer-27 (Nissley 1975; Jensen 1976). It is characterized by flexed burials associated with spire-ground modified saddle, saucer, split-drilled *Olivella* beads, and *Macoma* clam disc beads. These artifacts indicate a Middle Period occupation. Other artifacts include perforated canine teeth, bird bone whistles, bone awls, spatula grass cutters, spatulate bone tools, rings of slate and jade-slate, flat pebble pendants, mortars and pestles, millingslabs and handstones, and a variety of projectile points. Architectural remains include four fragmentary floor surfaces, all suggesting the presence of small circular houses about 10 to 12 feet in diameter. The presence of marine shellfish refuse in the midden and large notched and stemmed projectile points similar to those found on Monterey Bay, in conjunction with the lack of extended burials (a Central Valley trait), led Olsen and Payen (1969) to conclude the complex might represent an intrusion of coastal people into the area possibly in association with southern Santa Clara Valley populations.

The late prehistoric period, termed Gonzaga Complex (450 to 1,000 BP) is characterized by the dominance of extended burials associated with a wide variety of artifacts. *Olivella* bead types include whole spire-ground, thin centrally perforated rectangular, split-punched, oval, and several variant types of the thin rectangular form. Freshwater mussel disc beads, whole limpet shells, and *Haliotis* shell ornaments (circular, oval, and tear drop being the most frequent) are also present. Projectile points are rare, restricted to silicate specimens with square and tapered stems, as well as a few fragments of obsidian serrated forms. Bone artifacts include awls, pins, incised mammal bone tubes, bird bone whistles, and scapulae grass cutters. Large spool-shaped ear ornaments and small cylindrical plugs comprise the polished stone assemblage. Milling equipment includes large bowl mortars, shaped pestles, slab mortars

(rare), and slab millingstones and handstones. Architectural structures increase in size, ranging from 20 to 30 feet in diameter and in some cases includes center posts. Extended burials associated with large quantities of shell beads and ornaments contrasts significantly with both earlier and later periods of occupation.

The protohistoric period called the Panoche Complex (200 to 450 BP) is known from several sites and first defined by Olsen and Payen (1968) at CA-Fre-128 and CA-Fre-129. Diagnostic artifacts include clamshell disc beads, *Tivella* tubular clam beads, steatite disc beads, *Haliotis* epidermis disc beads, *Olivella* beads (lipped, side-ground, and rough disc), small side-notched projectile points, a variety of bone objects (awls, scapulae grass cutters, incised bird bone whistles, short bone beads, and dagger-like pieces), steatite ear spools, simple conical pipes, slate pins, a variety of mortar and pestle forms, and only a few millingslabs and handstones. The complex is also recognizable by the Panoche Side Notched projectile point, a unique projectile point form based on the desert side-notched form common to the western United States (Figure 3.13-1). Structures include large circular assembly/ceremonial houses (approximately 75 feet in diameter) and smaller circular dwellings, usually 30 to 50 feet in diameter. In addition to flexed burials, primary and secondary cremations are present.

Figure 3.13-1: Panoche Side Notched Projectile Point
found in the CCMA (E. Zaborsky, USDI BLM).

Based on regional comparisons of numerous traits, it was noted that each major temporal period seemed to reflect occupations by different populations, or at least populations with divergent cultural/geographic affinities. The Positas Complex, although poorly represented, showed relationships to the south coast, while the Pacheco Complex was thought to possibly represent intrusion of peoples from the Monterey Bay area. Most conspicuous of all was the Gonzaga Complex with its extended burials similar to the Delta, followed by the protohistoric Panoche Complex, probably representing the ethnographically recorded Yokuts.

3.13.3.2 Ethnographic Present

The CCMA was a region used by different Native American populations in prehistory well into the European Contact period with Spanish settlers, followed by Mexican and then American settlers. By the beginning of the 20th century, California Indian peoples had experienced a dramatic shift in demographic distribution across their ancestral territories and extreme changes to their socio-cultural traditions and

economic systems. As Anthropologists set out in the early 1900s to characterize and record the cultural behaviors, practices, and physical traits of the California Indians – much as military and religious expeditions had done a century before – the documentation of these extant tribal groups during that era has become a standard point of reference when talking about modern Native American tribes and cultural groups.

The CCMA may lie within the Chalon Costanoan/Ohlone region. The Chalon were known to have occupied the area around Chalone Creek - bounded to the west towards the Salinas River (Salinan country) and east to headwaters of the San Benito River in the Diablo Mountains that flanks the San Joaquin Valley (towards Tachi Yokuts country). The northern and southern extent of their occupation is less well defined, bounded by the Mutsun Costanoan to the north and the Salinan Indians to the south. However, it can also be argued that the region lies in an area where exact Native Californian tribal affiliation is unclear. The classic ethnographic literature also ascribes the region to the Tachi band of Yokuts Indians, largely on the basis of hydrographic provenance. In the past, watersheds were typically used in Native Californian ethnographic research, as a defining boundary line for much tribal territorial delineation.

More current archeological research in the region has yielded a different interpretation. It is possible that the Chalon band of Costanoan (or Ohlone) Indians may have inhabited the area, based upon material culture identification and mortuary practices observed at CA-Fre-1333. A less investigated hypothesis relies on ethnohistoric data obtained from the baptismal records at Missions of San Antonio de Padua, Mission San Miguel, Mission San Juan Bautista, and Mission Soledad. Based upon general village location information supplied to the padres by the neophytes, the district may belong to the Chene band of the Salinan Indians. Ethnographically the Chene are not recognized as a distinct group, but this may only be a function of limited ethnographic details. The Salinans could only be loosely identified to either a Migueleno dialect (southern Salinan) or an Antoniano dialect (northern Salinan) (USDI 2005:3-37). Excavations at CA-Fre-1331 indicated a Yokutsian presence during the Late Period, prior to or coeval to the time of European exploration in California. There was also evidence of a much earlier occupation and interment, perhaps indicating the presence of another ethnic group (Zaborsky 2006).

Costanoan/Ohlone

The Costanoan were speakers of languages in the Penutian language family. The Costanoan (now commonly referred to as Ohlone) consisted of over 50 tribelets, speaking eight different but related languages that included: Karkin (southern edge of Carquinez Strait); Chochenyo (east shore of San Francisco between Richmond and Mission San Jose and probably Livermore Valley); Tanyen (southern San Francisco Bay and lower Santa Clara Valley); Ranaytush (San Mateo and San Francisco Counties); Awaswas (Santa Cruz Costanoan between Davenport and Aptos); Mutsun (Pajaro River drainage); Rumsen (lower Carmel, Sur, and lower Salinas Rivers); and Chalon (Salinas River) (Levy 1978:485-486). This territory encompasses a lengthy coastline as well as several inland valleys (Breschini et al. 1983:34).

The Ohlone relied on gathering, hunting, and fishing to procure a wide variety of flora and fauna for subsistence and material needs. The Ohlone had both permanent village locations and seasonal camps to take advantage of the diverse terrain along the central coast. The first Spanish encounters with the Ohlone occurred as early as 1602 with the Sebastián Vizcaíno navigational expedition, followed by the inland exploratory expedition of Gaspar de Portola in 1769. Seven missions were established in Ohlone territory between 1770 and 1797 (Levy 1978:486). Ohlone were both forcibly and voluntarily brought to the missions along with other tribes, including Yokuts, Miwoks, Esselen, and Patwin. Once part of the mission system, the Ohlone were discouraged or forced from practicing their traditional rituals and social activities (Levy 1978:486). Contact with Euroamericans resulted in a drastic reduction of population due to disease, violence, and a declining birth rate. Ohlone population fell from an estimated 10,000 in 1770 to less than 2,000 in 1832 (Cook 1943a, 1943b). Following the secularization of the missions in 1834,

most of the remaining Ohlone moved into growing towns to work as laborers or domestic servants (Bean 1991:xxii). By the mid-twentieth century, the Ohlone population was reduced to a few hundred people in the San Francisco Bay area (Galvan 1968; Levy 1978).

In the 1960s the Ohlone Indian tribe was incorporated as a formal organization now holding title to the Ohlone Indian cemetery in Fremont, California (Bean 1991:xxiv). In the 1970s the Pajaro Valley Ohlone Indian Council was created and actively preserves sites of traditional importance. Four groups of Ohlone are now seeking recognition: the Amah-Mutsun Band (Gilroy / San Juan Bautista area), the Carmel Mission Band (Monterey region), the Indian Canyon Band, and the Muwekma/Ohlone tribe (south San Francisco Bay Area) (Bean 1991:xxvi). The Ohlone have not been recognized by the Federal government and therefore have not received recognition, compensation, or assistance to preserve and protect their heritage. There have been continued efforts to document genealogies by using mission records to piece together family and tribal history. The groups mentioned above, as well as other individuals, have been actively involved in the management and preservation of their heritage and are frequently involved in the management of cultural resources. Ohlone descendants continue to conduct ceremonies and traditional practices such as the gathering of plant materials for basket making.

Salinan

The Salinan language speakers occupied a rugged and mountainous area in the south central coast of California. Salinan territory spanned from the later location of Mission Soledad on the north, southwest past Junipero Serra Peak to the town of Lucia along the Pacific Coast, and south to the north end of San Luis Obispo County (Hester 1978:500). The Salinans lived in both permanent and seasonal villages along the coast and relied upon a subsistence strategy that consisted of hunting, gathering, and fishing. Very little is known regarding their prehistory. During the late eighteenth century two missions were founded within Salinan territory, which ultimately led to the decline of Salinan population to fewer than 700 by 1831 (Hester 1978:503). Disease, lowered birth rate, and violence were a few of the factors that reduced Salinan population. Following the secularization of the missions, Salinan survivors remained in the vicinity of the missions, but their populations continued to decline rapidly. By the 1880s Henshaw (in Powell 1891:101) estimated Salinan population to be only 12 persons (Hester 1978:503). In 1928 the California Roll enumerated 36 Salinans (Kroeber and Heizer 1970:13). Two Salinan groups petitioned the Federal government for tribal recognition – the Salinan Nation in 1989 and the Salinan Tribe of Monterey County in 1993. Members of those groups and other individuals have been active in cultural resource management projects in the Central Coast region to help manage and preserve what remains of their heritage.

Yokuts

In ethnographic research, the Yokuts were distinguished geographically between the Northern Valley Yokuts, Southern Valley Yokuts, and Foothills Yokuts. The western-half of the ancestral territory of the Northern and Southern Valley Yokuts is located within Hollister BLM San Joaquin and San Benito Management Areas.

The Southern Valley Yokuts occupied territory in the southern portion of the San Joaquin Valley from the lower Kings River to the Tehachapi Mountains. Their territory was largely a slough-marsh environment consisting of the Tulare, Buena Vista, and Kern Lakes, their connecting sloughs, and the lower portions of the Kings, Kaweah, Tule, and Kern Rivers (Wallace 1978:448). At the beginning of the historic period at least 15 Yokuts groups inhabited the area, each with a separate language (Kroeber 1925:478-483). Each of the groups averaged 350 persons for a total population of 5,250.

In 1772 Pedro Fages led an expedition through Southern Valley Yokuts territory. Additional expeditions did not occur until around 1802, when the Franciscans were looking for potential mission locations. The

tribes along the lakes surprisingly did not come under the control of the Franciscan missionaries, though some of the Tachi, Telamni, and others ended up relocating to the missions. In 1833 a malaria epidemic swept the valley with an estimated mortality rate of 75 percent (Wallace 1978:460). With the U.S. annexation of California in 1848 came the near total disappearance of native people from the San Joaquin Valley. While thousands of gold seekers poured over the Sierra Nevada, American settlers began to invade the Valley, ruthlessly displacing the remaining Yokuts populations. The Yokuts open-valley habitat made them extremely vulnerable, and there was no way for them to escape the full force of Euroamerican settlement (Wallace 1978:460).

In 1851 the tribes relinquished their lands for reservations and goods but the treaties were never ratified by the United States Senate (Heizer 1972:26-37). A series of unsuccessful reservations was created, and it was not until 1873 that the Tule River Reservation was created in Tulare Country (outside the Planning Area), which is now home to the majority of Southern Valley Yokuts. In 1934, the Santa Rosa Rancheria was established on about 40 acres in Lemoore, California (outside the Decision and Planning Areas) with about forty Yokuts. For many years, those on the reservations lived in impoverished conditions. In 1983, the tribe established a gaming casino that has helped provide jobs and economic stability to the reservation. The Tachi Yokuts of the Santa Rosa Rancheria are currently the only federally recognized tribe affected by the CCMA planning effort.

3.13.3.3 Historic Era

Exploration and Settlement

Historically this region of California was isolated from major population and transportation centers and therefore remained largely unsettled until the mid-nineteenth century. The first Europeans in the region were Spanish explorers, reaching the southern San Joaquin Valley under the leadership of Pedro Fages in 1772. The early 1800s were the most active period of Spanish exploration in the San Joaquin Valley, followed by limited trapping expeditions.

The earliest permanent settlers in the foothills of the South Coast Ranges were Mexican citizens and Californios. Mexican Governor Manuel Micheltorena granted a tract of land in this region in 1844; eleven square leagues to Julian Ursua and Pedro Romero, called Panoche de San Juan y los Carrisalitos. The 8,903-hectare (22,000-acre) rancho passed through a number of hands until the late 1870s at which time Daniel Hernandez acquired the land and ran a sheep ranch

According to Peter Frusetta (former California State Assemblyman from San Benito County), Hernandez Valley was named for Augustine and Jesus Hernández who were farmers in the region in the 1870s (Iddings 2005a:1). Hernandez Valley provided access into the southwestern portion of the CCMA. The United States Postal Service established the Erie post office in Hernandez Valley in 1874. The name "Erie" is associated with the Erie school district which opened in 1871. According to Jack James and Henry Carrillo, the Erie school building was located near the junction of Coalinga Road and Clear Creek Road (Iddings 2005d:1). The school was named "Erie" by Adherbal Button because Erie, Pennsylvania was he and his wife's American hometown. It was Button who purchased Augustine Hernández's ranch in the early 1870s (Iddings 2005a:1). The Post Office name was changed to "Hernandez" in 1892, moved to different locations in the Valley, and finally closed in 1936 (Iddings 2005d:1). Hernandez Valley is now partially covered by the Hernandez Reservoir, which was completed in 1962.

Located in eastern Hernandez Valley near the entrance of the CCMA is Byles Canyon, named after Joseph "Joe" Byles. Byles arrived in San Francisco as a sailor aboard a British ship in 1861 and later joined the U.S. Navy in 1872. He was stationed aboard the USS Benicia for three years; the same vessel that carried King Kalakana of Hawaii to San Francisco (Iddings 2005c:3). Byles moved to the town of San Benito around 1880 and married Emily Jane Prater in 1882. Their first child, James "Jim," was born

on the Rosetti Ranch near San Benito in 1884 and they moved to Hernandez Valley a short time later where he became a prospector, miner and rancher. Their other five sons were all born in Hernandez Valley (Iddings 2005c:3). Byles' wife died on Thanksgiving day in 1901, six weeks after giving birth to their son Archie. It is believed that she is buried in Hernandez Valley somewhere near their homestead in Byles Canyon (Iddings 2005c:3).

East of Hernandez Valley, the San Joaquin Valley has many important landmarks related to the region's Californio heritage, and just east of the CCMA is one of the more famous locations: Joaquin Rocks. Joaquin Rocks and nearby Cantua Canyon area were reportedly used at different times as a horse holding area and hideout by the notorious bandits Joaquin Murieta (1850s) and Tiburcio Vasquez (1870s). Historically the name Joaquin Murieta was associated with a gang of approximately 80 Californio men (and several women) that in the late 1840s and early 1850s captured and drove wild and stolen horses from all over central California south to Sonora, Mexico. During the Gold Rush-era this gang became known among American settlers (mostly of European descent) for their daring horse raids, robberies, and occasionally murder. From the stories of these crimes rose the legend of Joaquin Murieta, a Mexican-American "Robin Hood" figure who reputedly robbed and murdered in retaliation for injustices suffered by he and his family at the hands of violent rogue gold miners in the Sierra Nevada. In 1853 the California Rangers under the direction of Captain Harry Love claimed to have tracked the outlaw horse gang to their stronghold at Cantua Creek and took credit for having killed Joaquin Murieta himself.

Wright Mountain located west of Joaquin Rocks was named after the early 20th century pioneer Dick Wright who lived most of his life in the CCMA. Wright was the son of a family who settled the Lemoore area of Kings County in the 1800s. He lived a solitary lifestyle in a "very simple brush cabin" and prospected for ores. According to oral history, Wright never rode a horse or in a vehicle but instead always walked to his destination. Wright would collect a monthly pension check at the home of local rancher in Los Gatos Creek Canyon, but after he failed to show up for two months at the rancher's house in 1945, the rancher went to check on Wright and found him dead in his modest cabin. He was buried near his cabin and Dick Wright Spring is named in his memory.

In 1907 a relatively new government agency chartered under the United States Department of Agriculture took ownership of a large portion of the CCMA from the United States General Land Office. This agency was later known as the United States Forest Service (USFS), and created the San Benito Division of the Monterey National Forest. Approximately 150,000 acres were set aside for the new Forest, including all of Sections in T18S, R12E and T19S, R12E and portions Sections in T17S, R11/12E; T18S, R10/11/13; T19S, R10/11/13 MDBM. The San Benito Division of the forest was "located principally in Clear Creek, Saw Mill and Eagle Creeks" (Sloane 1914:III,26). Part of the responsibility in managing this new forest reserve was to create a Plan of Operations, approved in October 1914. The Plan provided basic regional information and characterized the natural resources available or being currently utilized.

Within the historical context of the Plan, it is interesting to observe how the attitude of government officials in their descriptions of citizenry has changed over time. In "Section I, General Description, Settlements" of the Plan, three "distinct classes" of people were identified as living in the region: "Mexican (includes Spanish Land Grantees), mostly easy-going, careless, ignorant and unprogressive Mexican type…Americans, coming in the early days to California in search of gold and locating a homestead…the descendents of the above two classes" and "the 41 survivors of the vanishing race of Salinan Indians live for the most part in the neighborhood of Jolon" (Sloane 1914:I,6).

Subsequent descriptions and accounts of natural resource utilization by those area residents are more revealing, especially in "Section III, Timber" of the Plan. The timber utilization policy in the San Benito Division in the early 20th century was to "cut as much timber as there is demand for, regardless of annual increment or growing stock" (Sloane 1914:III,25). The Plan further stated:

> …the demand for timber has been greater than the supply. The New Idria Mining Company has utilized closely all of the timber that we would mark for cutting. Here there has also been considerable demand for cordwood. In addition to the usual material, chaparral has also been used extensively as fuel for quicksilver reduction purposes. The future demand on this Division will depend largely on the mines. Otherwise the market will be in the local valley region. All material cut in the past has been closely utilized (Sloane 1914:III,23).

Also of note there was a "good system of roads throughout this Division" and as maintained would sustain a permanent means for transportation (Sloane 1914:III,23). The Coulter pine tree species - an integral part of the San Benito Mountain Research Natural Area forest - was described as a "very inferior lumber species" and only "used for mining timber and cordwood" (Sloane 1914:III,5). There was also a significant distribution of barren, treeless areas estimated to be 4,000 acres within the San Benito Division, described as "barren slopes of serpentine without any trace of vegetation" (Sloane 1914:III,7).

Almost immediately, the conflicting mining claims within the forest and "political pressure from grazing and homesteading interests apparently made management of the rather small National Forest unit difficult" (Griffen and Yadon 1989:17). Eventually the land reverted back to the public domain in 1916, portions of which eventually became the CCMA.

Ranching

Settlers in the area relied on an economy of cattle, sheep, and grain production in the late 1860s and early 1870s. During this period increasing numbers of European-American settlers moved to the western San Joaquin Valley. Large ranching enterprises such as the Domengine Ranch spread from the Coast Range east to Fresno and covered more than 10,000 acres throughout the western part of the San Joaquin Valley during this period. Cattle baron Henry Miller (i.e., Miller & Lux) also used thousands of acres of land in this region as part of his cattle-ranching empire. These foothills were well-suited to grazing sheep and cattle, although improved irrigation, other agronomic advances, and the inception of rail and truck transport in twentieth-century San Joaquin Valley made row crops a viable pursuit during this time.

The operation of sheep and cattle ranches varied during the nineteenth century. Most ranches consisted of some acreage occupied by a ranch house with widely distributed ancillary features; many sheep ranches consisted solely of corrals and watering locations with an occasional cabin, although shepherds often slept near their herds in the pastures.

Smaller ranching operation were able to co-exist with the larger operations by utilizing areas that were adjacent to the productive grasslands in the San Joaquin Valley. For example, a goat ranch operated in the CCMA area during the late 1800s. Today the peak Goat Mountain was once known as Great Mammoth Peak because it resembled the head of a mammoth when viewed from Clear Creek Road. However, by the 1920s it was renamed because local rancher and miner Joe Tirado ran his goats on the mountain (Iddings 2005b:2).

Oil

While ranching and farming remained a significant enterprise in areas surrounding the CCMA, petroleum production represented the second lucrative local industry in these areas. The town of Coalinga and the Pleasant Valley area was the site of one of California's biggest early oil booms. The Coast Range Oil Company of Los Angeles sank one of the first wells in 1890 in the Oil City field, a few miles northeast of present-day Coalinga. In the late 1890s, a pipeline was built from Oil City south to a Southern Pacific railroad station near Coalinga, where the oil was loaded into tank cars for export. As new oil fields were discovered, large oil companies became more commonplace, and large pipelines were constructed to move oil across the South Coast Ranges to ports on the Pacific Ocean. In September 1904, the Coalinga

Oil and Transportation Company began construction of the 104 mile six-inch diameter pipeline from Coalinga to Monterey; completed in 90 days. The oil was used to fuel steamers at the Monterey wharf and also was transported to San Francisco (Cohan 1997).

Concurrent with early oil speculation, coal mining established and funded an infrastructure that would facilitate the oil boom. Robinson & Rollins, a British firm, opened a mine on the western side of Pleasant Valley. The coal was hauled to the Southern Pacific railroad station in Huron until the Southern Pacific extended its line to Alcalde. Narrow-gauge spurs were built from the mine to three loading sites called Coaling Stations A, B, and C. When the oil boom took off, Coaling Station A became known as the town of Coalinga.

Oil was discovered early in the Vallecitos Valley in 1886, just north of the CCMA Planning Area. The California Central Oil Company spent a reported $20,000 to sink a well that only produced a "small quantity" of oil and operated for less than two years (Irelan 1888:488). Shell Oil Company began production in the Vallecitos in 1951. Even though Shell Oil had apparently made contracts with some local landowners to sink wells, several parties filed suit in 1957 claiming partial ownership of the property and rights to part of the revenue from the oil. These ownership challenges were eventually settled in the 1960s (Jackson and Armstrong 2008:12).

An oral history provided the San Benito County Historical Society in 1979 by Julius Nunez, a former long-time resident in the CCMA, recounted the discovery of oil in Vallecitos Valley:

> This was this side of the New Idria mines, what they call "the Vallecitos," and that man John Ashurst (who was a family man) passed on, and it was his sons who struck oil there. There were many oil wells up there, and they became very rich. In fact, one of the sons had his own plane, and they raised a lot of cattle over there. They were just millionaires — all, from this little trade that my dad made for a horse" (Kier 1979:2).

Mining

Historically, the region was known as the New Idria Mining district. Discovered in the late 1840s – early 1850s by Mexican prospectors, large portions of the CCMA were mined for mercury to produce quicksilver during the California Gold Rush era. The New Idria Quicksilver Mining Company began mining in 1854, working a "huge deposit of naturally occurring cinnabar and native mercury found in the mountains and in the canyon followed by San Carlos Creek" (Iddings 2007a:2). Mercury from the CCMA was vital to gold production in the Sierra Nevada of California as well as silver mining at the Nevada Comstock Lode (Gilbert 1984:10). Later in time, the district's mercury was used in medical products, paint, and even munitions for World War I. Other materials such as asbestos, magnesite, nickel, and chromium were also extracted (USDI 2005). The region in general was a historically active mining and ore processing area between about 1855 and 1970, and as such, supported a" diverse community of social, civic and industrial activity" represented by at least two dozen historic mine and mill sites (Fowkes and Iddings 2008:13).

The New Idria Quicksilver Mines and Idria townsite are located north of the CCMA on the slope below San Carlos Peak. Dozens of freight wagons loaded with flasks of quicksilver or provisions and mail passed daily for nearly a century along the road through Panoche Valley between New Idria (the town was also referred to as simply "Idria") and San Juan (San Juan Bautista), approximately 68 miles away. The route was lined with small settlements, including the station of Tres Pinos, now called Paicines. The quicksilver mines operated by the New Idria Mining and Chemical Company extended into the CCMA and were open until the company terminated in 1972-1974 (USDI 2007). During the 1880s this region was home to about 4,000 people who lived in various small communities and outlying cabins (Fowkes and Iddings 2008:5).

Since the 1850s at Idria there were professional miners from Chile, along with miners and other workers of Mexican, Irish, or Cornish descent. These miners were typically young single men. According to the1880 United States Census, other documented laborers included those of German, Scotch, French, Chinese, and Portuguese nationalities. Asian workers were commonly employed as furnace tenders – one of the most dangerous jobs because of the risk of inhaling mercury fumes. Non-mining occupations included brick-makers, sawyers, blacksmiths, carpenters, butchers, washers, house-keepers, and shepherds (Gilbert 1984:18). Separate camps for specific nationalities and/or ethnicities existed at Idria; Chilean Camp (also referred to as Mexican Flat) was located near Idria as early as 1867 and was occupied at least until 1879 (Gilbert 1984:18). There were also separate economic ventures by individual ethnic communities: in 1868 a group of Mexican miners formed the "Union Mexicana" corporation in order to raise enough money to work a nearby quicksilver site which they had discovered (Gilbert 1984:18).

Early mining at New Idria had to contend with poor transportation networks to market the refined cinnabar. The distance from San Juan to the mine, about seventy-five miles over trails and mountain roads which were not always accessible, "required from two to five days" (Hillhouse 1931:3). In September 1858 at Idria there were eighty-eight miners. At that time it was estimated that 75,000 pounds of freight supplies had to be transported to the mines to sustain them for a two month period (Hillhouse 1931:15).

By 1867, the New Idria Mine had five working tunnels and the San Carlos Mine had seven. The large work area for the mines was called the Hacienda, where cinnabar was sorted and roasted. A brickyard, blacksmith shop, and boarding house were also located at the Hacienda site (Gilbert 1984:8).

There were no railroads or telegraph services to New Idria. Fuel and equipment had to be "produced on the spot at high cost, or shipped in under crude and slow methods, which were also costly" (Hillhouse 1931:18). By 1900 Idria began substituting oil for wood as fuel. Oil was procured from shipping points in Coalinga and Mendota to the east. Trucks hauled the oil from the San Joaquin Valley to Jackass Grade in Fresno County, approximately thirty-five miles from Idria. From that point horse-drawn carriages delivered the oil in tank wagons to the mines (Gilbert 1984:24).

In 1906 the San Benito County Board of Supervisors allowed telephone lines for thirty miles along the route from the Idria mines north into Panoche Valley. This allowed the officials at Idria to make direct contact with the New Idria Mining Company headquarters in Boston, Massachusetts (Gilbert 1984:24). By the 1910s, New Idria had a good road network for large trucks and "a gigantic plant, operated by electricity with the latest equipment; gasoline locomotives for hauling; fuel oil ovens melting over 700 tons of ore per day and producing upwards of 450 flasks of quicksilver" (Hillhouse 1931:18).

One of the more important cinnabar ore-processing methods invented at New Idria was the creation and installation of four Gould Rotary furnaces in 1918. Henry Gould was a mining engineer who arrived at Idria in 1908 to oversee cinnabar ore extraction, and while there he created an improved technique for the heating and collection of liquid mercury from cinnabar. Refined elemental mercury is extracted from cinnabar by roasting the material in a furnace to vaporize the mercury. The vaporized mercury is then sent through a series of condensers to cool, which forms into droplets and settles at the bottom of the condensing chamber where it is collected and bottled into steel flasks. The Gould Rotary furnace allowed for a very efficient (95%) processing of quicksilver opposed to earlier furnace designs (Iddings 2007:2).

Although the mining and processing of cinnabar was a difficult and dangerous job, even the journey to reach Idria could be a challenge…but had its own rewards:

> After a day or two of rest, we continued to Tres Pinos a very small village some distance south of San Jose, to catch a wagon to Idria. It was a big haywagon with benches on both sides, hitched to four large horses, which took us up the mountains. It took half a day to reach the place. We

> crossed several creeks and stopped to move big rocks that had rolled down the road from the mountain. The scenery was beautiful - tall pine trees and hilly country - with very few houses along the way. Every time we moved, we came to a different kind of world. This was the best so far. The pine trees smelled good, and the cool air made us feel refreshed (Lee 1990).

The above passage is a recollection of a trip to New Idria in February 1914 by a young Korean immigrant girl, Mary Lee, who came with her family to the United States to escape the ethnic cleansing occurring as a result of the Russo-Japanese War and the invasion of the Korean Peninsula in 1905. Once they arrived at Idria, her description of the town and mines reflects many other recollections about the place from other residents:

> The mines, the company buildings, the hotel, the store, the houses of a few Caucasian families, and the boardinghouse for Caucasian workers all had electricity, but there was no electricity in the shacks for the rest of the workers - mainly Mexicans, with a few Koreans (Lee 1990).
>
> Father worked in the furnace area of the mining company, stirring the rocks so they would burn evenly. He had to wear a piece of cloth over his nose so he would not breathe the poisonous fumes whenever the lid was opened. It was a hard, nasty job that few men wanted to do, even though the pay was five dollars a day, an unheard of amount in those times (Lee 1990).

Despite the hazardous activity at the mines and mill sites, and the working landscape that seventy years of intensive mercury processing had created, it is interesting to note that even one-hundred years ago people came to visit the CCMA to get away from their perceived rigors of urban life in order to refresh themselves:

> In the spring, after the snow had melted away, the sun brought all the beautiful flowers to life…Every weekend people from San Francisco, Berkeley, and San Jose drove up to enjoy the scenery and to get some flowers. All the children came out to pick flowers, which we sold for twentyfive cents a bunch (Lee 1990).

Life-long San Benito County resident Julius Nunez, who lived and worked in Idria from 1902-1923, provided a wonderful amount of oral history information to the San Benito Historical Society in 1979 before his passing. Born at the mining community in 1902, there were nearly five-hundred families living in the area. There was no residential indoor plumbing or electricity, and home goods were obtained through a company store:

> Money didn't really mean anything to us, because my mother had the General Store. So, we didn't have to have money to buy anything. Later we drew on company checks and could buy everything from meat to vegetables and clothing. Why, if we even found pennies and nickels on the ground, we wouldn't even pick them up, because we didn't need them to buy things (Kier 1979:1).

Between the residents of the Idria mining community and the surrounding area there were social and economic relationships that proved advantageous to both parties. Nunez recounted a regular occurrence between local ranchers and miners:

> In the early days there was a family up there [at New Idria] we used to call "The Lilies" [Lillis]. They used to raise a lot of cattle up in the hills around New Idria, and used to hire a lot of cowboys for a roundup that they had once a year. They'd come in and brand cattle while the families would all get together. We'd come by buggies - families and the children. They played games, the mothers used to bring in salads and cakes, and the men, of course, would have beer. Altogether, they had barbecue and the roundup. They'd kill a beef and consumed it mostly in one

> day. I wonder now how we ate that meat; it was so fresh. What was left they divided for the families. We used to have some good times in those days (Kier 1979:5).

Mining itself was a dangerous occupation, no less so at Idria. However, in remote mining communities when a communicable disease affected the population, that community was left to rely upon itself until more effective medical treatments could arrive (immunizations, etc.). Nunez reluctantly described an Influenza outbreak that impacted the Idria district from 1917-1919:

> People were dying like - well, every minute you were seeing bodies dropping on the streets, like dead rats. A cousin of mine and I were able to get around while pretty near everybody was dying or sick. It was a mess. There were a lot of single men in those days up there, and we didn't know whether their families had come from Mexico, or Spain, or wherever. They wrapped their bodies up with a sheet and we'd hook up some horses and take them out and dig ditches - with the four horses and mud up to our knees - and bury them by throwing dirt over them and letting them rest. Isn't that terrible? (Kier 1979:3)

Individual burial sites and cemeteries for miners and their families have been created over the decades throughout the CCMA. It is a distinct possibility that many of these locations are not well-documented or might have never been known to the general community. This aspect of the historical landscape should be considered in any historical reconstruction of the CCMA landscape:

> An uncle of mine passed away, and in those days they didn't have any Hearst or undertakers, so they put the body in a blanket. We walked about ten miles, behind the funeral wagon, to the place where they buried him. There was a place [where he was buried] called Larios Peak - there's also a Saxon's [Sampson?] Peak - I'll never forget that funeral procession; it takes you back a long time (Kier 1979:5).

In addition to mining for cinnabar and mercury, there were efforts to recover other minerals of commercial value. Many of these mines were worked by employees or families of New Idria:

> Yes, of course, up at the mines there are other minerals besides quicksilver. There's magnesite - I worked with magnesite as a youngster - you know what magnesite is: it's a big, white mineral, used to make sinks - it's a white ore that's very hard. Also, there was asbestos up there; of course, they say asbestos is bad for you - you get cancer working around it (Kier 1979:7).

During World War II, the Idria mines were one of the most important mercury extraction sites in the world for munitions and batteries manufacturing (Gilbert 1984:37). However, a very large wildfire in July 1942 put a strain on quicksilver production at Idria. As the mines were important to the war effort, two hundred soldiers from Fort Ord were deployed to help get control of the wildfire (Gilbert 1984:38).

On large linear feature related to the mercury mining operations at Idria still exists today on public and private lands in the CCMA (Figures 3.13-2 and 3.13-3). It is the remains of two aerial trams that serviced the Aurora and San Carlos mines:

> …the road from the San Carlos Mine to the furnaces was a circuitous one, and the hauling of the ore to the furnaces proved too costly. For this reason, the company constructed a two-mile tramway from the San Carlos Mine to the reduction works. The tram began operating in September 1915, marking the first time since 1864 that workers roasted ore from the San Carlos Mine in the furnaces. The tramway had thirty buckets, capable of holding 1,000 pounds of ore per bucket. The tram descended 2,130 feet in elevation between terminals and could carry twenty tons of ore hourly (Gilbert 1984:25).

Figure 3.13-2: Aerial Tram in service from New Idria to San Carlos Mines 1942 (A. Feininger, Office of War Information, National Archives).

Figure 3.13-3: Historic Aerial Tram Structure near San Carlos Peak 2007
(R. Tiffen, California Archaeological Site Stewardship Program).

The Aurora mine site, also known as the Morning Star mine (CA-SBn-192H), was discovered by Mexican prospectors in 1853 looking for silver but who instead found mercury. Part of the New Idria complex, Aurora was mined throughout its history primarily for mercury and later for chromium. It was worked intermittently until 1911 with other concentrated mining efforts occurring between 1915-1917 and 1930-1943. Smaller scale production continued into the mid-1950s. In 1911 a rotary furnace was installed, but due to technical and logistic supply problems the furnace only ran for one day. Several structures that related to the mining industry at Aurora have been destroyed by other miners seeking material to reuse, dismantled by the BLM for safety reasons, or vandalized by visiting users to the CCMA. The Aurora Mine was in part the inspiration for Bret Harte's 1878 literary work *The Story of a Mine* (USDI 2005).

Another example of historic mercury production in the CCMA was the Alpine Mine, once known as the Esmeralda mine. Regular mercury production began here in 1912 with concentrated output generated sporadically from 1912-1914, 1916-1917, 1928, 1932-1936, and finally in 1945-1950. In 1915 a twenty-ton capacity Scott furnace and four brick condensers were installed to process the mercury, in addition to two pipe retorts already being used, but the furnace only operated until 1917 (USDI 2005).

The townsite of Picacho was a small mercury mining community located on Picacho Creek south of San Benito Mountain. After the Picacho Mine was discovered in 1858 by Edward C. Tully and Wiley Williams, the town grew to three hundred residents in size. A U.S. Post Office opened in 1869 to serve Picacho but closed in 1880 when postal services were redirected to the Erie Post Office in Hernandez

Valley. Adherble Button, a resident of Hernandez Valley, managed the mine from 1871 until 1881. During this period the mine remained inactive until a new road was constructed to the mine in 1878 (Iddings 2005d). A visit by the United States Geological Society (USGS) in 1884 described the Picacho area:

> Within a few miles of the area mapped and to the southwest, several mines have been opened and again abandoned. The Picacho is in the usual contorted, highly indurated rocks, partly silicifled and partly converted into carbonates. The ore appeared to have occurred in cracks across the strata and along the partings. It is said that the first continuous quicksilver furnace ever built in the State was erected here by Mr. John Roach. This structure was still in place at the time of my visit, in 1884, and substantially in the same condition as when it was examined by Mr. Goodyear thirteen years earlier. Several pounds of quicksilver still remained in the wooden condenser, showing how slowly quicksilver must volatilize, even at the high temperatures which prevail in this region during the summer. Near Clear Creek also are two mines, or prospects, at which ore associated with rocks of the same type as at the Picacho was extracted (Becker 1888:309).

The mine was originally referred to as Picachos or Los Picachos. In 1902 it became known as the Ramirez Mine, later renamed the Hernandez Mine after 1913. The last known mining work occurred in 1939 (Iddings 2005d).

By far, cinnabar and mercury was the predominant mineral material historically extracted from the CCMA region. However, several other important minerals were also mined including magnesite, chromite, and asbestos. A large magnesite deposit near Sampson Peak was worked extensively during the early to mid 20th century (Figure 3.13-4). Magnesite was used in flooring and for electrical insulation applications. The Butler Estate Chromite Mine which opened in 1954 was the largest commercial chromite mine in the CCMA. A small "chromite boom" occurred in the CCMA during the 1950s-1960s as a reaction to the need for metals in post- World War II domestic automobile production. There have been at least three significant asbestos mines in the CCMA since the 1950s, namely the Railroad Mine (a.k.a. Johns-Manville Union Carbide Mine), the Atlas Mine, and the KCAC Mine (King City Asbestos Company). The Railroad Mine and Atlas Mine are located on private land but are surrounded by BLM public land, and both mines were designated as EPA Superfund sites under CERCLA. The KCAC Mine is also on private land and was the last active asbestos mine in the United States; the mine closed in 2002. Asbestos was traditionally used as an insulator material because of its durable "fireproof" nature.

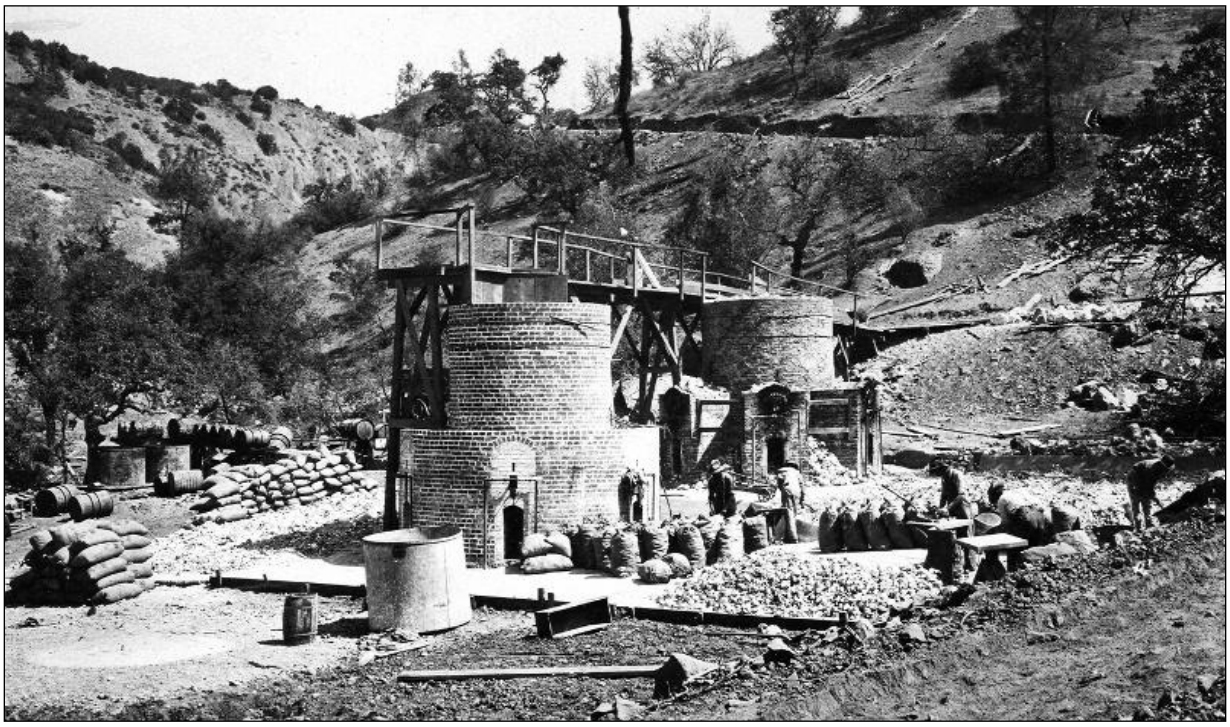

Figure 3.13-4: Hoffman-Price Magnesite Kilns near Sampson Peak 1917 (R. Stone, USGS).

3.13.4 Current Conditions and Trends

3.13.4.1 Current Conditions

Archeological sites and other cultural resources are classified by the BLM into specific use allocation categories, each with a desired outcome. Refer to Table 3.13.4.1.A below:

Table 3.13.4.1.A: Cultural Resource Use Allocations and Desired Outcomes

Use Allocation	Management Actions
Scientific Use	Permit appropriate research, including data recovery
Conservation for Future Use	Propose protection measures/ designations*
Traditional Use	Consult with tribes; determine limitations
Public Use	Determine limitations, permitted uses*
Experimental Use	Determine nature of experiment(s)
Discharged from Management	Remove protective measures

* Managers may impose safeguards against incompatible land and resource uses through withdrawals, stipulations on leases and permits, design requirements, and similar measures which are developed and recommended by an appropriately staffed interdisciplinary team.

In resolving conflicts between competing land use allocations with the potential to adversely affect cultural resources, the BLM shall consider all prudent and feasible alternatives to avoid adverse effects on historic resources. Where such alternatives require undue cost or are incompatible with undertaking goals, the BLM shall balance goals, considering the magnitude of the harm to the resource, the significance of the resource, the effect of mitigation activities on the competing use allocation, and public sensitivities.

Benefits from the use of cultural resources may derive directly from the actual places on public lands, but also indirectly from the information - documents, records, or museum collections - that result when these places are recorded or scientifically investigated. These "information benefits" include an increased knowledge about past and contemporary cultures through formal archeological, anthropological, or historical study. Socio-cultural benefits may accrue to the general public or to a specific cultural group as a result of studying or interpreting resources that are representative of a group's culture and history. Economic benefits may come about as a result of Heritage Tourism efforts that incorporate these cultural resources.

There are also recreational and/or inspirational benefits; outdoor enthusiasts such as horseback riders, mountain bikers, hikers, and photographers use cultural resources as a focus for their personal recreation. For many of these recreationists, the benefits they derive are an increased sense of place and an increased connectedness to, and appreciation for, their historical roots or other sense of place. Heritage education programs serve to inspire and stimulate the public across a broad spectrum of subject areas while improving knowledge and respect for other cultures. Increasingly, cultural resource materials are being used to improve student reading, writing, mathematics, reasoning, and higher order thinking skills through the development of lesson plans, hands-on activities and multi-media products.

Previous Studies and Planning Decisions

In the "Affected Environment" section from a previous off-highway vehicle (OHV) impacts study for the Laguna Mountain Area in 1981, a discussion of the physical effects to cultural resources - specifically archeological sites - is still largely applicable today:

> Those archeological site types which are least susceptible to [OHV] impacts are bedrock mortars. Midden soil deposits and their constituents' surface and subsurface artifact assemblages, and housepit features are all quite fragile and highly susceptible to direct impact from [OHV] activities. These activities cut into such cultural resources, alter constituent relationships both vertically and horizontally, cause artifact breakage and fragmentation, and can initiate and/or accelerate erosional displacement of site components. Indirect impacts in the form of casual surface collection and purposeful vandalism can occur as well. Although hill-climbing activities are usually the most surface-disturbing, most archeological sites do not occur on steeper slopes. Gentler slopes, flats, and hydrologic features do contain the majority of sites and would probably focus vehicular presence and activity both atop and around archeological sites, thus, potentially causing the direct and indirect impacts mentioned above. In short, if an area or route is to remain "open," this generally results in higher maintenance costs; involving site monitoring, perhaps stabilization, etc. By contrast, when a route or area is designated "closed," there are lower costs associated with maintenance and protection (USDI 1981:21-22).

In 1968 BLM withdrew the Clear Creek Canyon bottom from further mineral entry and development previous allowable under the 1872 Mining Law (USDI 1978:12). The first BLM cultural resources survey in the CCMA was in 1975, completed by California State University Stanislaus. The inventory completed a general reconnaissance in three main canyons of the CCMA: Clear Creek, Picacho Creek, and Byles Canyon. It was determined that Clear Creek Canyon received "the brunt of human impact" attributed to mining, road construction, and OHV use (Napton 1975:3). As observed in Clear Creek Canyon:

> ORV [OHV] activity has effected [sic] archeological sites on the flatlands near the creek, for example ORV-Four [CA-SBn-59] and South Fork site [CA-SBn-67], and on the uplands, for example ORV-Three [CA-SBn-58]. A secondary effect of ORV [OHV] utilization has been a large influx of campers. Site ORV-Two [CA-SBn-57] and Site ORV-Fifteen [CA-SBn-64] are located in areas utilized for camping (Napton 1975:2).

In Picacho Creek canyon, observed impacts were less severe and "restricted to mining activities at the head of Picacho Creek, the Picacho Mine, and the Saint Thomas Mine at the lower end" of the canyon (Napton 1975:3). In 1975 the mouth of the canyon had been cut off from vehicle traffic because there was a private residence (Kennedy Ranch); observed OHV impacts were seen on "hills north of the creek" (Napton 1975:3). In the 1980s this private residence was sold to a private motorcycle club (Salinas Ramblers) that has participated in OHV events and free riding throughout the CCMA since the 1960s. In Byles Canyon which opens up into the Hernandez Valley, only three OHV single-tracks were observed.

The inventory study concluded that impacts to cultural resources resulted from "three agencies" – natural erosion, mining and prospecting, and recreational vehicles (Napton 1975:16). At the time, the study recommended that "controlled collection of archeological materials is probably the only effective form of mitigation applicable in the Clear Creek area in view of the existing circumstances" (Napton 1975:17).

In 1981 the first formal attempt at OHV designations for the CCMA (at that time the "Clear Creek Recreation Area") was created using data from the 1975 California State University Stanislaus inventory and an informal BLM inventory in 1980. The two studies located a total of 23 sites on public land, twelve of which were regarded as significant enough to be considered eligible for listing in the National Register of Historic Places (NRHP). These archeological sites were prehistoric habitations and camps with bedrock mortars, rockshelters, caves, isolated artifacts, midden soils, and petroglyphs. All of the sites had received some degree of human disturbance, and many were "in danger of complete destruction as a direct or indirect result of ORV [OHV] activity" (USDI 1981:28).

The OHV designation for CCMA was allowed, but not without some impacts to cultural resources. Two categories of impacts were identified: direct and indirect. It was determined that uncontrolled OHV use "in the past" and at present was "causing adverse impacts to the cultural resources within the Clear Creek ORV [OHV] area…Impacts range from complete destruction of these resources to localized pot hunting of certain sites" (USDI 1981:35). Direct impacts included activities such as OHV trails through archeological sites and camping on top of them. Indirect impacts were brought about by "access being created to potential and known cultural resource sites and areas," primarily resulting in the looting and vandalization of those sites and resources (USDI 1981:36). The decision under all OHV designation alternatives was that significant archeological sites would be protected, and site-specific protection would be most expensive under the "open" and "partial closure" alternatives and least expensive under the "closed" alternative. Furthermore, increased visitor use and access into areas designated as "open" would require more extensive protection of sites (USDI 1981:26).

The CCMA was historically bounded by smaller Planning Area units which the BLM used to characterize and manage the region. In addition to the 1975 cultural resources inventory within the CCMA, these other Planning Area units were also surveyed. Lands in the Laguna Mountain Area were cursorily examined in 1980 for cultural resources by inspecting existing vehicle routes and adjacent areas. The results included the discovery of one "occupation site with midden" on BLM land (postulated to be associated with the Chalon Costanoan) and three additional occupation sites containing "midden, lithics, BRMs, housepits and groundstone," presumably not located on BLM land (USDI 1981:16). In the former Call Mountain-Hernandez Valley Management Area, the known sites at the time were in poor to good condition; road construction, uncontrolled OHV use, and unauthorized artifact collection were the main threats to cultural resources (USDI 1984:32). Impacts to archeological sites in the former Ciervo Hills-

Joaquin Rocks Management Area were primarily a result of cattle grazing, road construction, natural weathering and erosion, unauthorized artifact collection, and uncontrolled OHV use (USDI 1984).

Management Issues and Goals for cultural resources identified in the first Hollister Resource Management Plan (RMP) in 1984 were brief but clear. The Issue: direction for inventory, management, and interpretation of cultural resources. The Goal: "Ensure that cultural resources of high scientific, interpretive, or sociocultural significance are not destroyed by other land uses" (USDI 1984:12). Native American values identified in the 1984 RMP were defined to "revolve around the protection of Indian burials and access to cemeteries" (USDI 1984:8). In essence these issues, goals, and values have not fundamentally changed in 25 years.

General mitigation and monitoring protocols for all resources within the CCMA were established in Appendix I of the 1984 Hollister RMP. Cultural Resources (Item #5) prescriptions called for photo monitoring (USDI 1984:99). The RMP provided little specific guidance for cultural resources management in the CCMA other than existing legislation. Within the CCMA Planning boundary in 1984 there were approximately twenty-five known archeological sites on public land in a "very good" to "destroyed" condition. Impacts from historic mining, road construction, uncontrolled OHV use, soil erosion, and unauthorized artifact collection were identified as the main threats to cultural resources (USDI 1984:52).

Three decisions to be implemented specific to cultural resources management in the Clear Creek - Condon Peak Management Area were outlined in the 1984 Hollister RMP: (1) determine the National Register eligibility for the White Creek Archeological District; (2) develop a Cultural Resource Management Plan for White Creek, focusing on the effects of wildfires and OHVs; and (3) implement the "Clear Creek ORV Designation and Implementation Plan," which directed fencing and barrier protection for NRHP-eligible archeological sites (USDI 1984:57-58). To successfully implement these Decisions, the RMP also called for data retrieval (e.g., excavation) on "approximately 3 sites" (USDI 1984:59).

As part of the 1984 Hollister RMP recommendations, a Clear Creek Management Plan was developed and approved in 1986 with a Record of Decision (ROD). All of the cultural resources management decisions from the Clear Creek - Condon Peak Management Area in the 1984 Plan were restated in the 1986 Plan and ROD. Subsequent amendments to CCMA plans do not address cultural resources as a separate planning issue (including a 1995 FEIS with 1999 ROD, and a 2005 FEIS with 2006 ROD), as the 1986 Management Plan adequately covered the basic treatments for cultural resource identification and protection.

Within the 1986 Clear Creek Management Plan and ROD, "Protective Measures #4" mandated the installation of vehicle barriers where necessary (USDI 1986a:iv). The Plan also addressed "on-the-ground management and needs and actions for the Clear Creek Serpentine Area of Critical Environmental Concern," specifically for (in original order):

(1) cultural resources
(2) wildlife habitat
(3) recreation
(4) asbestos hazard
(5) watershed issues
(6) endangered plant habitat
(7) hobby gem and mineral collection, and
(8) unique soils (USDI 1986a:1).

The overall management goal for the 1986 Clear Creek Management Plan and ROD was to "Protect significant cultural, historical and visual resource values as well as the unique soil and vegetation of the

area" principally based on the belief that the cultural resources of the region were regarded as "irreplaceable aspect" of the area (USDI 1986a:2-3). "Objective #1" for area-wide (non-ACEC) management was to ensure appropriate measures for protection, data retrieval, and interpretation of cultural resources and to provide for opportunities for academic research (USDI 1986a:4). These planned actions for lands outside the ACEC were threefold: continued protection of White Creek (maintaining road closure until evaluated), data retrieval at three sites (chosen for management needs and ability to address research questions), and the use of fences/barriers to protect sites from human-caused or other disturbances (USDI 1986a:8). Appendix 2 of the 1986 Management Plan outlined "Planned Cultural Resource (Site Management) Projects," which included the annual inventory of "high sensitivity areas" (500ac/yr) with site monitoring and completion of the data retrieval by the end of fiscal year 1987 (USDI 1986a). Neither planned action was finalized.

In 1986 a separate Cultural Resource Management Plan (CRMP) was developed for the former Ciervo Hills-Joaquin Rocks Management Area, public lands managed adjacent to the CCMA (CRMPs are now referred to as Cultural Resource Project Plans – CRPPs). This particular Plan outlined measures to protect eight archeological sites identified in the region primarily in response to "ongoing impacts from road building, grazing, erosion, natural weathering, and ORV [OHV] use" (USDI 1986b:1). The eight sites were located in the Ciervo Hills (CA-Fre-1386, CA-Fre-2568, CA-Fre-2569), Cantua Creek (CA-Fre-3048/H, CA-Fre-3053, CA-Fre-3054) and Joaquin Ridge (CA-Fre-83, CA-Fre-2244) east of the CCMA. The CRMP stated that "most of these actions are occurring on a limited scale, and are not resulting in significant damage to the resources at this time" (USDI 1986:4). One exception to this was Birdwell Rock (CA-Fre-2244), a rock art site with petroglyphs becoming degraded due to weathering of the sandstone surface.

The following short-term management objectives were identified in the 1986 CRMP: (1) monitor the sites, (2) inventory or cultural resources on a regular basis, (3) record Birdwell Rock in detail; (4) protect the sites through the use of fences/barriers when significant impacts are detected (determined effective in mitigation for cattle and OHVs), and (5) if protection means are ineffective, then initiate data recovery (USDI 1986:4). The long-term management objective was to "preserve the resources in place for future socio-cultural and scientific use" (USDI 1986:4).

BLM monitors these sites on a semi-regular basis, biannually or as projects allow. The areas around these sites are inventoried under the guidance of Section 110 of the National Historic Preservation Act as much as possible, and are protected as necessary from natural causers (vegetation removal for fire) and human causers (truncated road lengths to limit users from accessing sensitive sites). Site CA-Fre-2244, Birdwell Rock, was formally documented and placed on the National Register of Historic Places in 2001**.**

Archeological site monitoring by Field Office staff, augmented (as appropriate) with an excellent Volunteer program, constitutes the primary method of data gathering for determining whether or not protective measures need to be incorporated or enhanced for a particular cultural resource. The California Archaeological Site Stewardship Program (CASSP) is the volunteer program approved by California BLM, the California Office of Historic Preservation (OHP), the California Department of Parks and Recreation Off-Highway Motor Vehicle Recreation Division (DPR-OHMVR), and the Society for California Archaeology (SCA). The SCA is the chief avocational and professional organization for archeological and historical research in California with over 1100 members and growing.

Artifacts that were not identified in previous cultural resource inventories have been discovered at recorded archeological sites; likewise archeological sites that were not identified in previous inventories have been discovered in areas regarded as adversely impacted by historic use. For example, a large chert projectile point was found at archeological site CA-SBn-60 in 2004 - a site that had been recorded in 1975. This point was identified and classified as a "Rossi Square-stemmed" point (Figure 3.13-5). The primary attributes of this artifact style are the pronounced square-shaped base and stem of the point. In

relation to its size (approximately8 centimeters long) it was probably used to hunt large game animals. This projectile point style appears to represent an ancient tool form but falls out of favor with its uses circa 1000 BC (M. Hylkema 2008: Personal Communication 01/16/2008). Prior to this discovery the site's only recorded artifactual constituents were a single chert flake and a utilized chert core.

Figure 3.13-5: Rossi Square-Stemmed Projectile Point found in the CCMA (E. Zaborsky, USDI BLM).

With respect to the artifacts documented at prehistoric archeological sites within the CCMA, they appear to be inter-related based upon regional bead and projectile point typologies through time (Bennyhoff and Hughes 1987; Olsen and Payen 1968, 1969). Functionally the combination of sites represent a range of domestic subsistence behavior that included plant collection and processing, animal hunting and processing, trade material manufacture, intensive short-term habitation, and interment. The full extent of prehistoric time depth is not fully understood for the CCMA. To date there are approximately seventy-five cultural resource locations in the CCMA. There have been two archeological excavation data recovery projects conducted at prehistoric sites in the CCMA. These studies attempted to mitigate the effects of vandalism at site CA-Fre-1333 (Breschini et al 1983) and provide invaluable baseline data for the region at site CA-Fre-1331 (Zaborsky 2006). These research efforts were compliant with previously established CCMA Management Goals stated in the 1986 Clear Creek Management Plan and ROD (USDI 2005:3-36).

Place names in the CCMA, like Indian Hill, provide a glimpse into the possible previous activities at a given location. At this place there are at least two origins for the name "Indian Hill." One story is that it was so named because of a large Native American village site that once existed there in Clear Creek Canyon. This site was apparently known among local residents as artifacts were collected from this place (Iddings 2008: Personal Communication 11/28/2008). The other naming origin story for Indian Hill recounts that at least since 1965, the site had been occupied by a Native American man from Arizona who

operated 2 small mercury retorts to earn a living. During 1967-1968, this individual was arrested by the San Benito County Sheriff's Department as he was wanted for murder in Arizona. Apparently he had been hiding from law enforcement authorities in the CCMA (Bunning 2008: Personal Communication 11/21/2008).

Another interesting namesake is Jade Mill, and like Indian Hill is located in Clear Creek Canyon. Jade Mill is currently a BLM limited facility camping site, but the area was once a mill site for jadeite material during the 1950s and 1960s. During this post-World War II era many people lived in the Canyon operating small mercury retorts to sustain themselves. Evidence of these small habitations and millsites have been lost to erosion, vandalism, or were cleaned-up under the BLM Abandoned Mine Lands remediation program. Jade Mill, the Alpine Mine, and the Xanadu Mill were sites in the Clear Creek Canyon watershed that were remediated to eliminate point-source pollution of mercury into larger watershed systems (e.g., Pajaro River watershed) (Figure 3.13-6). Many of these small sites were also located on top of earlier claims. For instance, the Jade Mill area had once been a chrysotile asbestos mine site operated by the "San Benito Asbestos Company" formed in 1917 (Fowkes and Iddings 2008:15).

Figure 3.13-6: Xanadu Millsite prior to Abandoned Mine Lands clean-up (T. Moore, USDI BLM).

3.13.4.2 Special Considerations

Clear Creek Serpentine Area of Critical Environmental Concern

The Clear Creek Serpentine Area of Critical Environmental Concern (ACEC) within the Clear Creek Management Area (CCMA) roughly approximates the boundary for the Hazardous Asbestos Area

(HAA). While there is no stand alone ACEC Management Plan, there are significant planning issues within the ACEC including cultural resources management. Under the 1986 Clear Creek Management Plan and Decision Record, policies and guidance for the management of prehistoric (and to a lesser extent historic) resources were established - with an emphasis on physical and administrative protection and data retrieval as a mitigation measure. Refer back to Section 3.13.4.1 for more specific information.

San Benito Mountain Research Natural Area

There are at least three prehistoric sites within the San Benito Mountain Research Natural Area (SBMRNA). These sites are small prehistoric lithic scatters, and at least one site has an unrecorded historic - possibly protohistoric - component. One of the sites is split between public and private land. Native American issues related to the SBMRNA focus on continued and future access to the area for traditional uses (non-Federally recognized groups). Current management direction for cultural resources in the SBMRNA is to protect all cultural resources, encourage public partnerships for research and education, and consult with Native Americans from local tribes.

Another observation between native plants and archeological sites was made at CA-SBn-212, located inside the Clear Creek Serpentine ACEC but out of Clear Creek Canyon and in the upper San Benito River corridor. The site has produced several temporally diagnostic surface artifacts ascribed to tool forms used between 3,600 and 1,600 BP which correlates to the "Pacheco A" complex of the San Luis-Little Panoche regional artifact chronology. In 1997 no other prehistoric activities and/or artifact types had been identified at this site. In addition to its possible great antiquity, the botanical setting at the site also deserved attention. It was noted that the archeological deposit occurred "almost exclusively within the extent of a large occurrence of rabbit brush [*Chrysothamnus spp.*]…Discussions with the Area Botanist have concluded that while rabbit brush is not unknown for the region, its occurrence this far west may be unusual, as is its occurrence on serpentine soils…its ethnogrpahic use among Native Americans is well documented within California" (L. Hylkema 1997).

At present probably the most interesting association between cultural and botanical resources is the relationship of prehistoric archeological sites and *Camissonia benitensis* (CABE) populations. It is well documented that mining during the 1860s - 1940s "impacted a sizeable portion of suitable habitat for the species" and modern-day formal and informal campsite areas have "eliminated most of the remaining habitat" (Taylor 1990:1). Early camps associated with mining activity were located on terraces adjacent to Clear Creek Canyon "doubtlessly had great negative impact on populations of C. benitensis, but the degree of such impact is purely speculative…Judging from the degree of past mining disturbance evident today, somewhat over half of the alluvial terraces along Clear Creek were impacted by this activity" (Taylor 1990:69). Even before intensive recreation management by the BLM occurred in the CCMA, by 1963 many areas had been impacted by camping activities "adjacent to Clear Creek, the headwaters of San Benito River, White Creek and in the Spanish Lake Area… there is heavy littering by the present campers" (USDI 1963:10).

The geographic distribution of CABE is generally "restricted to flat to gently sloping alluvial terraces" (Taylor 1990:24). At present, there are at least fifteen archeological sites that are directly associated with CABE Populations.

Native American Values

There are no Federally recognized tribal entities residing within the Planning Area boundary. However, the Tachi Yokuts Tribe of Santa Rosa Rancheria in Lemoore, Kings County, ranged prehistorically and protohistorically within the foothills of the western San Joaquin Valley and Diablo Range. The Hollister Field Office consults with the Federally recognized Tachi tribe as undertakings or proposals have the potential to affect their ancestral lands. There are also several non-Federally recognized tribes, groups,

and individuals of Ohlone/Costanoan descent that the Hollister Field Office consults with as Bureau policy dictates: to make good-faith efforts in consultation when projects have the potential to impact Native American archeological sites, native plant material collection areas, sacred sites, or other places of spiritual or socio-cultural value. Refer back to Section 3.13.2.2 "Native American Values."

A sacred site is defined by the BLM as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site" (DM 8120; from Executive Order 13007, Section 1(b)(iii)).

National Register of Historic Places

The National Register of Historic Places (NRHP) is the official list of the Nation's historic places "worthy of preservation." Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service (NPS) which is part of the U.S. Department of the Interior (http://www.nps.gov/nr/). National Register properties are distinguished by having been documented and evaluated according to uniform standards and set of criteria. These criteria recognize the accomplishments of all peoples who have contributed to the history and heritage of the United States and are designed to help state and local governments, Federal agencies, and others identify important historic and archeological properties worthy of preservation and of consideration in planning and development decisions.

Below is a list of potentially eligible properties for listing to the National Register of Historic Places (NRHP) within the CCMA Planning boundary. These are geographic/physiographic areas which contain one or more cultural resources ("properties") that are interrelated, some may even be considered a district:

Name of Resource/Property	***Era(s) of Significance***
White Creek	Prehistoric
Condon Peak/Upper Los Gatos Creek	Prehistoric
New Idria Townsite	Historic
San Benito Mountain Natural Area	Prehistoric, Protohistoric, and Historic
Clear Creek Canyon	Prehistoric and Historic
Hernandez Valley	Prehistoric and Historic
California State Gem Mine	Historic
Los Picachos	Prehistoric and Historic
Larious Canyon	Protohistoric, Historic, and Ethnographic
San Carlos Bolsa	Prehistoric and Historic
Cantua Creek	Prehistoric, Protohistoric, and Historic
Joaquin Ridge / Joaquin Rocks	Prehistoric, Historic, and Ethnographic
Upper San Benito River	Prehistoric, Historic, and Ethnographic

The above locations are intended to be general points of reference for discussion and are not yet properly defined historic districts or properties with recognized boundaries. Some of these historic locations are not in public ownership or are partially on private property. In the case of the New Idria townsite and California State Gem Mine, these properties are entirely on private land and would require approval of the land owner for nomination to the NRHP. Of note, the New Idria Gould Rotary furnace structure has been

proposed to the NRHP for listing, and its nomination is currently under review by the California State Office of Historic Preservation. The Gould rotary furnace was first developed and used extensively for mercury mineral ore processing at New Idria – a technological innovation that was mimicked by other mining industries around the world during the 20th century (Figure 3.13-7).

Figure 3.13-7: Gould Rotary Furnace at New Idria 1942 (A. Feininger, Office of War Information, National Archives).

Traditional Cultural Properties

The NRHP contains a wide range of historic property types that reflect the diversity of the nation's history and cultures. Typically buildings, structures, sites, historic districts, landscapes or individual objects can be listed to the Register if they meet the criteria specified in the Criteria for Evaluation (36 CFR 60.4).

One level or type of cultural significance a property may possess and may make it eligible for inclusion to the NRHP is "traditional" cultural significance. "Traditional" in this context refers to "those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice" (Parker and King 1998:1). According to the BLM, a "tradition" is defined as a "longstanding, socially conveyed, customary patterns of thought, cultural expression, and behavior, such as religious beliefs and practices, social customs, and land or resource

uses. Traditions are shared generally within a social and/or cultural group and span generations" (Department Manual 8120). This definition does not conflict with or challenge the TCP concept.

Traditional cultural significance of a historic property by definition is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Examples of properties possessing such significance include:

> A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
>
> A rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents;
>
> An urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices;
>
> A location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and
>
> A location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity.

A Traditional Cultural Property (TCP) is eligible for listing to the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). Traditional cultural values are central to the way a community or group defines itself, and maintaining those values is often vital to maintaining the group's sense of identity. Properties with traditional cultural value ascribed to them often take on this kind of vital significance. Typically any damage to or infringement upon them is "perceived to be deeply offensive to, and even destructive of, the group that values them" (Parker and King 1998:2).

TCPs can be difficult to recognize and define. A traditional ceremonial location may look like just a mountaintop or a lake; a culturally important neighborhood may look like any other group of houses, and an area where culturally important technological, economic, or artistic activities have been carried out may look like an ordinary building, field, or stream. TCPs may not necessarily be revealed through standard archeological or historical surveys. The existence and significance of TCPs often can only be ascertained only through interviews with users of the property or through other forms of ethnographic research. The subtle nature of TCPs "make it easy to ignore them; on the other hand it makes it difficult to distinguish between properties having real significance and those whose putative significance is spurious" (Parker and King 1998:2).

The concept of the TCP was originally applied with a focus to Native American properties, but the intent of TCPs "should not be taken to imply that only Native Americans ascribe traditional cultural value to historic properties…Americans of every ethnic origin have properties to which they ascribe traditional cultural value, and if such properties meet the National Register criteria, they can and should be nominated for inclusion in the Register" (Parker and King 1998:3).

Some National Register properties can be less than fifty years in age, only as long as their significance can be adequately demonstrated under the general NRHP Criteria. This test of "exceptional importance" for a property ultimately determines its eligibility for listing in the National Register - a principle which

safeguards against the listing of properties which are only of "contemporary, faddish value" and to ensure that the National Register is "a register of **historic** places" [emphasis theirs] (Sherfy and Luce 1998:1).

As a general rule "historic" properties that have achieved significance within the past fifty years are not eligible for listing to the National Register because the Register is "intrinsically a compilation of the Nation's **historic** resources that are worthy of preservation" and "does not include properties important solely for their contemporary impact and visibility" [emphasis theirs] (Sherfy and Luce 1998:1). It is nearly impossible and impractical to evaluate the historical impacts or relative value of a property immediately after an event occurs or a building is constructed; the passage of time is necessary "in order to apply the adjective 'historic' and to ensure adequate perspective" (Sherfy and Luce 1998:1).

Naturally, the more recent a property has achieved a recognizable level of significance the more difficult it is to demonstrate its "exceptional importance" (Sherfy and Luce1998:7). "Exceptional importance" does not necessarily imply a national-level of significance, rather it is a "measure of a property's importance within the appropriate historic context, whether the geographic scale of that context is local, State, or national" (Sherfy and Luce 1998:8). In the evaluating and justification of "exceptional importance" it is important to remember that the level at which this evaluation is made is "directly related to the geographic level or 'scale' of the property's historic context" (Sherfy and Luce 1998:8).

Arguably there are at least three distinct Communities that indentify the CCMA in a distinct way with their own distinct meaning: the California Indian/Native American Community ("The Land"), the OHV Recreation Community ("The Creek"), and the Gem & Mineralogical Society Community ("Clear Creek"). These three Communities use the CCMA in a fashion that fits well with the definition of a TCP, and has demonstrated this relationship in a meaningful way with the CCMA as a property over time.

In a request for public comments about the future use of and access into the CCMA, a total of fourteen Comment Letters were received from various clubs and organizations that had a self-perceived stake in the disposition of management at "Clear Creek." Nine letters came from off-highway vehicle (OHV) groups (American Motorcycle Association (AMA), District 36; BlueRibbon Coalition (BRC); California Association of 4-Wheel Drive Clubs, Inc. (CA4WD); California Off Road Vehicle Association (CORVA); Hayward Motorcycle Club, North Bay Motorcycle Club; OHV Consortium rep. by Moore, Turcke, & Smith Chartered; Sacramento Top Gun Jeep Club, Timekeepers Motorcycle Club), three letters came from gem and mineralogical societies (Bay Area Mineralogists (BAM); California Federation of Mineralogical Societies; Searchers Gem and Mineral Society), and one letter each from a botanical society and equestrian society (California Native Plant Society (CNPS) and California Equestrian Trails Lands Council, respectively) (USDI 2008).

A fourth community, the Hunting Community, is another set of people that could make a case for a Traditional Cultural Property relationship with the CCMA. The presence of this group is notable: technically this traditional use of the CCMA spans thousands of years, but the continual practice of use is not well documented - modern hunting methods and tools differ from prehistoric hunting techniques. Today's hunting trends focus around use of the Condon Peak area in the CCMA for pig, upland game birds like quail, and big game like deer. The San Carlos Bolsa area and even Clear Creek Canyon are popular for deer and pig hunting, and to the east of the CCMA on Joaquin Ridge deer hunting is very common. Early data from the region collected by the BLM indicated hunting as a recreational pursuit at least by the 1960s (USDI 1963:4).

California Indian/Native American Community

The CCMA has been used for thousands of years by local Native American tribal groups, including the Yokuts and the Costanoan/Ohlone. They lived, hunted game for food, quarried minerals for tools and pigment paint, camped for short-term and long-term intervals, harvested plants for food, fuel, and

medicines, and conducted socio-religious ceremonies that maintained their cultural identity. The evidence of these use-patterns is preserved in archeological sites, but also in California Indian traditions passed down between the generations. Some of these traditions were only known through oral history and were not documented in the ethnographic studies conducted by Anthropologists in the late 19th and early 20th centuries (Chapter 3.13.3.2).

Identified through consultation with California tribes, tribal groups, and individual Native Americans, there are several TCPs within the CCMA (Figure 3.13-8). In fact, the CCMA itself should be regarded itself as a single TCP for this Community. For the purposes of this RMP the exact locations and details of the nature of these tribal use areas are not discussed as part of BLM practice and to avoid unanticipated impacts to Native American practitioners. Needless to say that many places in the CCMA are associated with special uses, and to the east of the CCMA in the Joaquin Ridge area.

Figure 3.13-8: California Indian Traditional Use Area within the CCMA
(E. Zaborsky, USDI BLM).

Gem and Mineralogical Society Community

The CCMA has been an important location for over one hundred years, used by a special group of people who are interested in the science and beauty of geology. The people of this community search for and collect rock, mineral, and gem specimens from all over the world and are not ascribed to a single ethnicity, gender, economic class, or level of formal education. This community is known to gather together and share their experiences, finds, and sometimes trade collected items for other geologic items or for economic profit. Many of these community members join one another in regional organizations or private clubs. For the purposes of this discussion, this community shall be identified as the Gem and Mineralogical Society Community, and it is the whole CCMA which provides a significant part of their

community identity.

Some of the best information about this community of gem and mineral enthusiasts, collectors, and scientists whom view the CCMA as a special place and part of their group's identity was addressed in an October 2007 comment letter to the BLM from William Spence, President of Bay Area Mineralogists. It should be noted that some of the individuals in this community refer to themselves as "rockhounds," a term which is also used outside of the community to identify a mineralogical enthusiast that could be a novice or even a professional in the geological sciences:

> BLM should understand that without exaggeration CCMA is a world class rockhounding destination…Since WWII the discoveries of new minerals here have been made primarily by the efforts of rockhounds. Free access to CCMA for rockhounding is essential for the continuance of the hobby in northern California and continued research and discoveries related to the geology and mineralogy of San Benito County (USDI 2008).

Spence went on to describe more about their community; members are from both genders and visit the CCMA in small groups of "2 to 8 people, sometimes in larger groups but not often." Visitation to the CCMA by rockhounds may be as much as ten times per year but "the norm is probably between 1 and 3 visits per year." Another important aspect of the community is that "most rockhounds are over 40 years of age" (USDI 2008).

At least forty-five different species of rocks and minerals that are desired by rockhounds can found within the CCMA, including amethyst, benitoite, fresnoite, jadeite, plasma agate, quartz, and serpentine (Iddings 2004: 119-133). Some of the earliest documented recreational use of the area by the BLM identified the area as "intensively by gem and mineral clubs" (USDI 1963:4). Moreover, many universities and colleges have used the CCMA as a field school site since the 1900s, including local institutions like West Hills Community College in Coalinga, San Jose State University, the University of California, Berkeley and Santa Cruz campuses, and Stanford University.

The practice of being a "rockhound" and the participation in gem and mineral societies or clubs began in earnest during the early 20th century as an academic pursuit in California, and by the 1930s was a popular hobby. "Rockhounding" became more popular following World War II as more clubs and societies formed around the state (Spence 2008: Personal Communication). The CCMA became a known destination for rockhounders because so many different types of rock and gem specimens were available in one geologic formation (the Clear Creek Serpentine ACEC).

One such rockhounder during this era was Phil Bolander of Oakland, California. Bolander was a gem collector who was the first to discover perovskite and diopside in San Benito County. Bolander later died of a heart attack in the early 1950s while trying to free his car from mud on Clear Creek Canyon Road (Spence 2008: Personal Communication 10/31/2008). The great variety of minerals in the CCMA has been the draw "of many mineralogical societies over the years" but the unique gem benitoite is the only mineral that has "been intensely prospected for ever since its discovery" (Frazier and Frazier 1990:58). It is collected and prized by the rockhounding community not only for its beauty "but also its rarity…all in all, a most spectacular, unusual possession to have" (Norton 1976:32).

The mineral benitoite is only found in one locality in the entire world: the CCMA. Discovered in 1907, benitoite gems were originally mistaken for some type of diamond but that theory was soon discounted by University of California, Berkeley, geology professor George C. Louderback in 1909. Louderback published "one of the great classic papers of mineralogy and gemology: Benitoite, its paragenesis and mode of occurrence, Bulletin of the Department of Geology, University of California, vol. 5, no. 23, pp.331-380" (Frazier and Frazier 1990:56). This "much sought after publication" is famous for not only for its numerous illustrations but also for its completeness of the geological and mineralogical description

of benitoite. This study was recognized world-wide and has been described as a "bright chapter in the history of science in California" (Frazier and Frazier 1990:56). Louderback himself visited the benitoite mine, known in 1908 as the Dallas Gem Mine, and collected some outstanding specimens which are still on display in the Geology Department at University of California, Berkeley (Figure 3.13-9). Neptunite specimens from the benitoite mine are recognized as some of the world's finest examples, and Joaquinite gems are unique to only the benitoite mine in the CCMA (Spence 2008: Personal Communication 10/31/2008). Louderback was not only a professor at Berkeley but also graduated from the school with a Bachelor's degree in 1986 and a Ph.D. in 1899. Louderback died in 1957 and is regarded as "one of the founders of the scientific tradition of the University of California" (Taliaferro, Buck, and Lenzen 1959; George D. Louderback Foundation 2008).

Figure 3.13-9: Benitoite Specimen on Display at University of California, Berkeley (E. Zaborsky, USDI BLM).

Benitoite is a barium silicate crystal with a unique triangular crystal habit, "distinctive in the mineral world for being the only known representative of the ditrigonal dipyramidal crystal class" (Wilson 2008:1). Its color can be described as "pale to dark cornflower-blue to sapphire- blue color," found in direct association with neptunite and joaquinite and "is a special favorite among collectors" (Wilson 2008:1). Benitoite is primarily a collector's item but there is at least one industrial application for the gem: a minor amount of high quality benitoite is used to "help align and adjust electron microprobe beams" (CGS 2002:1).

In anticipation of the second annual convention of the California Federation of Mineralogical Societies in Bakersfield, January 1937, geology students William Nisson and George Switzer collected benitoite specimens from the mine and offered them for sale at the convention. Nisson became a geologist and discovered the copper mineral Nissonite east of Panoche in San Benito County (Spence 2008: Personal Communication). Switzer went on to start the Smithsonian Institution National Gem and Mineral Collection, beginning with the acquisition of the Hope Diamond in 1958. This National Collection is one of the most comprehensive in the world; it includes fifteen thousand gems, three hundred and fifty

thousand mineral specimens, three hundred thousand rock and ore specimens, and thirty-five thousand meteorites (Hevesi 2008).

Switzer graduated from the University of California, Berkeley, in 1937 and then earned a Master's degree (1939) and a Ph.D. (1942) in mineralogy at Harvard University. Switzer was Chairman of the Mineral Sciences Department at the Smithsonian's National Museum of Natural History from 1964 to 1969, and had been Associate Curator of the museum's Division of Mineralogy 1948 - 1964 (Hevesi 2008). He also played a significant role in analyzing rocks brought back from the moon by the Apollo 15 and 16 space missions of the National Aeronautics and Space Administration (NASA). In the 1970s through a grant from NASA, he acquired an electron probe micro-analyzer for minerals studies. This instrument, new at the time, allowed researchers to determine a mineral's origin. Dr. Switzer and other scientists examined samples moon rock samples with the analyzer and determined that "the moon never had water on its surface and never had an atmosphere like Earth's" (Hevesi 2008). Switzer passed away this year in March 2008.

The benitoite mine site also attracted two gem collectors from Los Angeles, California, in the 1930s: Peter Bancroft and Ed Swoboda. Photographs from their trips show the original cabins built in the 1900s and a forest prior to wildfires that consumed the CCMA in the 1940s and 1950s. Both of these rockhounds became "internationally prominent mineral collectors by the 1970s" from their work the CCMA (Spence 2008: Personal Communication).

An infamous story related to the benitoite mine dates to 1938. According to rockhounds, the Italian Ambassador to the United States was interested in the gem Benitoite, and purchased the largest cut gem known at the time - approximately 6.5 carats. He intended to present the gem as a gift to Benito Mussolini, the leader of Italy who would have his country become a part of the Axis powers in World War II. Subsequent to the Allied victory in Europe, the status and location of Mussolini's gem was lost to history and its whereabouts are currently unknown (Frazier and Frazier 1990:49).

During the 1950s, the benitoite mine was operated by Clarence L. Cole of Oakland, California, who promoted and advertised himself as "Cole's Mines" in various gem and mineral journals. He subleased the mine to various parties when he was not working it himself, including Josephine Louise Scripps (1910-1992), heir to the Scripps-Howard newspaper fortune and "a dedicated mineral collector" (Wilson 2008: 4).

In the late 1970s-1980s, the benitoite mine was operated by Buzz Gray and Bill Forrest of Fresno County, California. Gray and Forrest's mining activities and publicizing benitoite to collectors had finally brought the gemstone to the attention of the general public beyond the gem and mineralogical community. In 1985 benitoite was officially declared the State Gemstone of California. Gray and Forrest purchased the mine property from the Dallas family (Hellen Dallas Read) in 1987 (Wilson 2008:5).

It is important to remember that "scientific history was made with the discovery of benitoite" because to date "no naturally formed minerals have been proven to belong to this crystal class except benitoite and pabstite, the tin analog of benitoite" (Frazier and Frazier 1990:56). Pabstite was discovered in 1963 in the Kalkar quarry of Santa Cruz County, California (now part of the University of California, Santa Cruz) and is the only known locality in the world. It was named after the late Dr. Adolf Pabst of the University of California, Berkeley, "one of the greatest of American mineraologists…and was well known as a friend of amateur mineral collecting and collectors" (Frazier and Frazier 1990:56).

In 2003 gem concentrate material was produced by a new magnetic separation system, the first instance of magnetic separation technology used to separate gems from a concentrate. The new technique was employed at the benitoite mine site and effective in isolating benitoite gems from its natrolite matrix because "only benitoite, among all the various minerals in the deposit, contains no iron." The use of this

new, innovative process has finally allowed "commercial quantities of faceted benitoite became available for the first time since the early 1900s" for high-end jewelry brokers as well as a "flood of specimen material" that can be shared among the gem and mineralogical community (Wilson 2008:6).

On the County Road access to the private road to the Benitoite Mine - now referred to as the California State Gem Mine - there is a monument erected to honor the discovery of Benitoite. Constructed by the avocational historical society "E Clampus Vitus" (Monterey Viejo Chapter 1846 and James Savage Chapter 1852) and dedicated October 27, 2001, the plaque inscription reads:

> Benitoite was discovered on February 22, 1907 by James Marshall Couch while prospecting for quicksilver on a fifty dollar grubstake for shares from R. W. Dallas and Tom Sanders. On July 30, 1907, mineralogy professor George D. Louderback identified it as a new mineral species, Barium Titanium Silicate ($BaTiSi_3O_9$). He named it Benitoite after the river, county and nearby mountain range. The gem-quality crystal combines the color of a sapphire with the fire of a diamond. It looks like two studdy triangular pyramids attached at their bases; its shape is unique. It flouresces a bright deep-sky blue under ultraviolet light. Benitoite in gem quality occurs nowhere else in the world. It is associated with other rare minerals such as Fresnoite, Joaquinite, Natrolite, and Neptunite. They formed in fractures of a serpentine rock from hydrothermal solutions. Just how such solutions occurred and what other conditions caused the crystallization of these rare minerals is still not well understood. Benitoite was declared the official California state gem on October 1, 1985.

Off-Highway Vehicle (OHV) Recreation Community

As evidenced in visitor use data at CCMA and as witnessed in the Public Comment meetings for CCMA plan scoping in October 2007 and May 2008, there is an OHV community of several thousand people that consider the CCMA a special destination place. From the oral comments made at public meetings, in-the-field visitor contacts, and written statements provided by this community at meetings and open comment periods for planning documents, it is clear there is a history of use in the CCMA that is generational, familial, and possibly unique to this Management Area. Most of the community members live in central California and regard the "The Creek" as one of the more challenging, remote, and beautiful places to ride in the state. A history and information web site maintained by the public about the CCMA succinctly described the relationship between OHV use and the CCMA landscape:

> There is probably no place in California quite like Clear Creek for vehicle recreation. The old roads and trail provide an infrastructure for exploring the Clear Creek area. Whether you enjoy four-wheeling or dirt-biking, you will be able to find a trail to enjoy. There are roads and trails to satisfy every appetite - from easy to technically difficult. The upper elevations offer spectacular views.
>
> This area is also very rich in California history and because of the rugged conditions and remote location it can only be explored with OHV and dirt bikes are probably the vehicle best suited for exploring this rich and beautiful space. However, irresponsible driving can damage or destroy some these important historical artifacts. Please act responsibly while you tour this wondrous resource of the People's land (Iddings 2006).

The history of OHV use in the CCMA began unofficially with the use of mining trucks in the 20th century, which arguably created a large network of roads in the area to access mines and mill sites in the region. OHV as an established recreational pursuit did not occur in the CCMA until the 1950s-1960s. Perhaps the first motorcycle club (M/C) to "adopt" the CCMA was the Mountaineers M/C. The Mountaineers M/C was established in 1951, mostly from guys who were hillclimbers living in the San Jose area (Bunning 2008: Personal Communication). At one time the club was a recognized with the

American Motorcycle Association (AMA), District 36. One of the club founders, Slim Kocher, was a Ride Leader in the CCMA for many years. Club Rides were usually held during the winters, from 1960s-1980s, and took place all over the CCMA. The Mountaineers M/C still exists today as a loose organization of dirtbike and off-highway motorcycle riders; there are no dues. In 1985 Kocher passed away and the club erected a monument to his memory in the CCMA.

Glen Haston was the primary ride leader in the CCMA for the Mountaineers M/C in the 1960s. During this era the Mountaineers cut and engineered many of the original motorcycle OHV trails in the CCMA. On Saturdays club members would cut trails with machetes and on Sunday test-ride the newly constructed trails. In the winter of 1970, extensive flooding in the Clear Creek Canyon forced the Mountaineers to ride over the hill to Idria. There they met with then-mine Superintendent Mark Ward and camped out in the town (Bunning 2008: Personal Communication). This began a pattern of more extensive use in the CCMA of motorcycle-related OHV traffic. The Salinas Ramblers M/C (SRMC; once called the Salinas Dirt Riders) started coming to CCMA as a club in the 1960s. Gary Estes of SRMC (1962) was in the CCMA riding regularly beginning in 1969. The Mountaineer M/C trail system was extensively used by the SRMC during the 1980s (Bunning 2008: Personal Communication).

Until the 1970s and 1980s recreational motorcycle use apparently had been primarily in the Clear Creek Canyon area of the CCMA (Figures 3.13-10 and 3.13-11). The Idria and San Carlos Bolsa areas also received a fair amount of recreational activity from hunting and hiking, which created its own network of user trails. One motorcycle rider who was born in the 1930s used to visit relatives that worked the mines at Idria (a former mine superintendent) with his family until the company closed the mines in 1974. He began riding in the 1950s at CCMA, which according to him at that time had minimal motorcycle use but was becoming a more common pastime for local residents (Boyes 2008: Personal Communication).

Figure 3.13-10: Gathering of OHV Recreational Users in the CCMA 1973
(Unknown, USDI BLM).

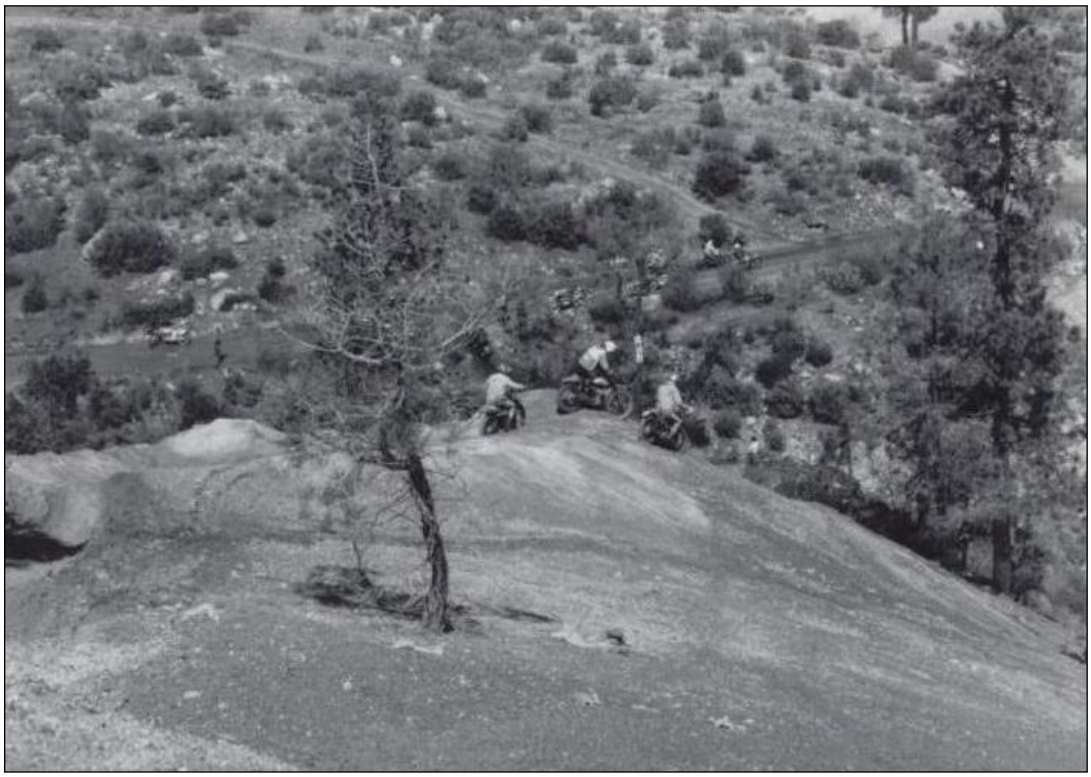

Figure 3.13-11: OHV Recreational Use in the CCMA 1973 (Unknown, USDI BLM).

The Salinas Dirt Riders disbanded around 1973-1976 and those members joined the Salinas Ramblers. During the 1950s and 1960s many of these riders had been using the Panoche Hills for OHV recreation (Tobin 2008: Personal Communication). By the 1960s OHV use on public and private lands in the inner South Coast Ranges increased. In the Panoche Hills, Tumey Hills, Ciervo Hills, and Kettleman Hills conflicts with grazing rights and soil erosion problems prompted the BLM to close those areas to OHV use in 1970 (Figure 3.13-12). As observed by many, much of this OHV use was redirected to the CCMA and "caused conflicts with other recreational uses and accelerated the erosion rates on the bald slopes used for motorcycle free play areas" (Griffen and Yadon 1989:17).

Figure 3.13-12: OHV Use Impacts in the Panoche Hills 1968 (Unknown, USDI BLM).

The SRMC formed in 1934, founded by Salinas, California, resident Larry Ketzel. The SRMC was "a family affair from the beginning…women have always been in the club and children are welcome on rides and campouts…The club's emphasis is on riding for pleasure" (Belli 1984). The club began with six charter members and strived to maintain a target membership of sixty people. The club historically would organize rides for fun and also to raise money for charity. Starting in 1982, the CCMA become the location of an AMA-sanctioned one hundred mile national enduro sponsored by the SRMC, nationally televised by ESPN (sports television network). The last of these "Quicksilver Enduros," the longest-running national Enduro and named in recognition of the rich mining history in the CCMA, was held in 2007.

There is more to a cultural property for a community than its historical use, although that is a significant component. Another component is how that community views that property as a place and what values they ascribe to it. In a non-traditional way, OHV use in CCMA can be viewed (quite literally) as the vehicle that allows a person to transcend the ordinary experiences of daily life and be allowed to contemplate other perspectives of being. The transcendence is commonly associated with values regarded exclusive to Wilderness concepts which emphasize a non-mechanized experience. A "Wilderness" can be a physical place, but it relies upon a "symbolic environment, a socially constructed behavioral setting…Like a church, cathedral, or monument to which it is so often compared, wilderness has become invested with meanings that make it prone to support spiritual interpretation and experience" (Kaye 2006:6).

As evidenced in the eighty written comments provided by the CCMA OHV user community, there are more values being demonstrated than simply OHV recreation. Without trying to bias their comments, for many of these people OHV is part of their wilderness experience and becomes a "medium for transcending the effects of socialization and conformity" (Kaye 2006:4). Below are selected questions and responses from the Public Scoping Form Comments reprinted out of the BLM "Public Scoping

Report Clear Creek Management Area Resource Management Plan and Environmental Impact Statement June 2008" which demonstrate community values related to OHV use at the CCMA:

Question: What do you value most about CCMA, and why?

> Besides great riding, this place is like a second home to me and my family. I have been recreating there since I was five years old. To have this place taken away is like losing a family member.
>
> CCMA is the largest, most unique and most versatile area I have ever ridden. If it is close I will not have the opportunity to enjoy it anymore, nor will I have the opportunity to share it with my children.
>
> The variety of terrain and great single-track! The weekends we enjoy as an entire family -- it would be very difficult to describe the importance to my entire family!
>
> Dirt bike riding, it is a huge wilderness area with many trails. It is a great place to enjoy the outdoors with friends and family.
>
> My family and friends have enjoyed using Clear Creek for many years. I enjoy camping, quad riding, four wheeling with my family and friends.
>
> If I want to go ride my motorcycle and asbestos it should be my God-given right to do so. CCMA is an area of history and heritage good for one thing, camping and riding. My club has used this area since the early 1950s.
>
> An outstanding place to ride off-road motorcycles and ATVs and other off-road recreation, four wheeling camping, etc. generations of families have enjoyed this venue.
>
> CCMA provides the most diverse experience anywhere in the nation for OHV use. CCMA was home to the longest-running national and early [enduro?] in the USA.
>
> Mental health cannot be measured by any chart. Mental health that is received by riding at Clear Creek, outweigh any supposed health risk assumptions given. We are not criminals do not turn us into criminals, that is the only government agenda.
>
> Freedom.
>
> A place to ride so I do not have to ride a legally [sic]. A place to go with friends and family. A place for kids to ride so they don't go down the wrong path.
>
> It's a very family-friendly area. Freedom. Family. Friends. Nature. The best riding in the world. Clear Creek is what California and America are all about. Don't take away my freedom!
>
> I value the time spent there with friends and family and what Clear Creek offers people during the different seasons of the year. I have enjoyed OHV riding in CCMA for over 35 years. I'm 68 years of age and have taken my family of four on many, many outings to CCMA. I value the recreation aspect of CCMA.
>
> I value the world-class riding and four wheeling. The incredible feeling of freedom being surrounded by beauty and open spaces. The memories that I have made in Clear Creek are some of the fondest memories that I have. The openness availability to move around unique soils and

therefore plants and animals and birds. The stark beauty.

It is very important to me that access to the land continues while protecting the land from destructive use that threatens the many rare species. Being able to get away from all the distractions at home (TV, phone, cell phone, etc.) and spend time together doing something we all enjoy is "priceless."

3.13.4.3 Trends

Archeological sites are fragile, and there are a variety of things that can alter, damage, or destroy them. There are two general categories of forces that can damage or destroy archeological sites and their values: natural forces and human forces. Examples of natural forces are erosion from wind or water, flooding, freezing and thawing, animal action (e.g., burrowing, digging, or trailing), vegetation, fire, landslides, earthquakes, or volcanic eruptions. Examples of human forces are vandalism, looting and theft, uncontrolled recreation (e.g., off-highway vehicles, bicycles, or animal traffic), development (e.g., agriculture, mining, logging, oil and gas, dams, roads, or utilities), fire suppression activities, noise vibration, or incompatible laws, regulations, and procedures.

Forces of nature act continually on archeological sites, ranging from the relatively minor activities of earthworms and freeze-thaw cycles to major catastrophic events such as earthquakes and volcanic eruptions. Many natural forces have acted in conjunction with human action over time to form the archeological site, and archeologists have developed techniques to understand how natural forces affect the formation of archeological sites. Sometimes erosion and patterns of plant growth help archeologists find archeological sites. Some natural forces have worked to encapsulate sites that were later discovered and studied by archeologists. However, these same forces can change and can destroy archeological information by increasing the rate of decay for perishable organic materials such as fabrics, basketry, and leather, as well as disrupt the spatial and temporal relationships of archeological information (e.g., moving artifacts around).

The most varied and damaging forces affecting archeological sites are caused by humans. Looting and vandalism are the major sources of site damage and destruction. Motivations for these behaviors vary. Archeological sites are sometimes "mined" for commercial profit where artifacts have monetary value on the national and international art markets. This is especially true on BLM lands in the Southwestern United States and along the Colorado River in Southern California. Other sites are looted to acquire relics for personal collections or small-scale profit at hobby shows. This is probably the more common problem to BLM in Central California. These kinds of activities are illegal on Federal, tribal, state and county public lands without a permit.

Although site damage and destruction from looting is deliberate and intentional, other actions that damage cultural resources occur largely because of ignorance of a site's existence or its importance. Despite a general, widespread public fascination with archeology and learning about a “hidden” past, the consideration of archeological sites and related issues (including Native American values) is usually not factored into the daily conduct of individuals, governments, or businesses unless legislated and implemented.

General land development and resource exploitation activities continue to increase as the nation's growing population demands for more food, housing, manufactured goods, and of course places to recreate - in a variety of different ways. Each of these actions involves land modification that can damage or destroy archeological sites. While not intentional, some of these activities take a greater toll on archeological sites than others. For example, agricultural activities such as land-leveling and plowing may either move archeological materials around and mix materials from separate layers or just totally destroy the site, depending upon the depth of the archeological remains. Massive land modifications that accompany

flood control projects, large-scale residential developments, and interstate highway construction can cause the loss of hundreds of archeological sites – site that represent entire communities that once thrived in the past. Recreational access and site development can also impact archeological resources through indirect or unintentional user activities or poorly developed facilities by the agency responsible for providing the recreational opportunity.

Off-highway vehicle (OHV) use presents the most immediate threats to negatively impacting cultural resources in the Clear Creek Management Area (CCMA), especially at archeological sites. With a properly designed and well-designated route system, inadvertent damage to archeological sites can be avoided. Typically the observed and reported damage to cultural resources in the CCMA results from off-trail vehicular play or OHV trespass into closed areas that are protected for natural and/or cultural resource values. There have been a few incidents of reported unauthorized collection at prehistoric and historic sites, but as best as can be determined these incidents fall into the category of uninformed, unintentional attempts at artifact collection, not directed vandalism or intentional looting of sites for artifacts.

There is also illegal marijuana cultivation in the CCMA. This activity has the distinct possibility of indirectly impacting archeological resources through physical site alteration (e.g., spring sites development, planting, etc.). This illegal activity also affects Native American traditional cultural use practitioners. The presence of marijuana farmers protecting their gardens with firearms or other weapons poses a danger to the safety of the practitioners, not to mention the disruption to the natural ecosystem that native use plants need to thrive. Natural weathering and soil erosion also affects cultural resources in the CCMA. The serpentine soils of the New Idria Formation are highly susceptible to heavy rain events that can displace large amounts of soil given the right circumstances. Other factors that can affect cultural resources result from agency use: recreational site development, road maintenance, or controlled burning/prescribed fires. These factors are identified through planning and are mitigated for through project redesign, monitoring, Native American consultation, data retrieval, or a combination of these measures.

3.14 Paleontological Resources

3.14.1 Introduction

The paleontological resources found on the public lands are recognized by the BLM as constituting a fragile and nonrenewable scientific record of the history of life on earth, and so represent an important and critical component of America's natural heritage. BLM will exercise stewardship of these resources as a part of its public land management responsibility.

3.14.2 Regulatory Framework

In addition to the Federal Land Policy and Management Act of 1976 (FLPMA), Paleontological Resources are protected under several regulations and policies described below:

Antiquities Act of 1906 (16 U.S.C. 431-433) provides that penalties shall be assessed against "any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States" except as granted permission by the appropriate secretary of the department having jurisdiction; permits the examination, excavation, or gathering of antiquities from government property by recognized scientific or educational institutions in accordance with uniform rules defined in the act.

Omnibus Public Lands Act of 2009, Paleontological Resources Preservation (OPLA-PRP) P.L. 111-11, Title VI, Subtitle D, Sections 6301-6312, 123 Stat. 1172, 16 U.S.C. 470aaa law requires the Secretaries of the United States Department of Interior and Agriculture to manage and protect paleontological resources on Federal land using scientific principles and expertise. The PRPA includes specific provisions addressing management of these resources by the Bureau of Land Management (BLM), the National Park Service (NPS), the Bureau of Reclamation (BOR), the Fish and Wildlife Service (FWS), and the U.S. Forest Service (USFS).

Title 43 CFR 8365.1-5 addresses the collection of invertebrate fossils and, by administrative extension, fossil plants, including the willful disturbance, removal and destruction of scientific resources or natural objects, and Subpart 8360.0-7 identifies the penalties for such violations.

Title 43 CFR 3802 and 3809 address protection of paleontological resources from operations authorized under the mining laws.

BLM Manual 8270 and Handbook H-8270-1 provides the criteria for permitting, collection, and use of fossils on BLM administered lands, and creates a framework for how geologic formations are ranked according to paleontological potential.

3.14.3 Regional Setting

3.14.3.1 Geologic Setting

The CCMA Planning Area is within the Coast Range Physiographic Province of California; bounded by the Pacific Ocean to the west and the great Central Valley to the east. It is characterized by northwest-southeast trending faults and mountain ranges (Staebler 1981; USGS 2005). From the Upper Cretaceous time period through the Miocene epoch much of Hollister Field Office Area was periodically covered by shallow, warm seas which allowed sediment to wash onto the area from the low-lying continental mass to the east**.** This is evident in the San Joaquin Management Area that shows great thickness of Jurassic age or younger marine and terrestrial sedimentary deposits (Staebler 1981).

3.14.3.2 Paleontological Setting

Since the first major paleontological discovery in 1937of a nearly complete plesiosaur in the Moreno Formation, both the Moreno and Temblor Formations have produced many fossils that are either endemic, unique, or serve as guide fossils (Staebler 1981). Most major localities within the Moreno and Temblor Formations are located within the boundary of the Panoche/Coalinga Area of Critical Environmental Concern (ACEC).

There are no significant paleontological resources that have been discovered within the boundary of the CCMA. It is expected that fossil invertebrates can be associated with the Panoche and Franciscan Sandstone Formations which contact the New Idria Serpentine Formation (refer to Table 3.14.4.2. below).

Table 3.14.4.2 - Rock Formations in the Planning Area and their Paleontological Sensitivity

Formation Name	Formation Description	Formation Age	Fossil Types known to Occur	Paleontological Sensitivity[1]
Panoche	Clay shale to conglomerate beds of boulders up to several feet in diameter	Upper Cretaceous	Mollusca including ammonites	Class 3
Franciscan	Sandstones, shales, cherts, and limestones	Jurassic, Cretaceous	Invertebrates, vertebrates, plants	Class 3
New Idria Serpentine	Metavolcanic minerals and ores	Late Jurassic	None	Class 1

Notes: [1] Paleontological Sensitivity conditions are subject to change based upon new data provided to BLM by qualified experts working in the Planning Area.

Paleontological Sensitivity is defined by the "Potential Fossil Yield Classification" (PFYC) system. The PFYC is utilized for land use planning, the preliminary assessment of potential impacts to fossils for specific projects, and identify proper mitigation needs. It is intended to provide a tool to assess potential occurrences of significant paleontological resources on BLM administered lands.

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed level. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

There are five classes within the PFYC system; Class 1 is rated as having "Very Low Potential" to Class 5 having "Very High Potential." It is important to note that although granite, lava beds, and other igneous or metamorphic rock types are usually considered to be void of any fossils, outcrops of these rocks may have fissure fillings, cave-like structures, sinkholes, and other features that may preserve significant paleontological resources or information, so the potential is not zero; therefore Class 1 is applied to these rock types usually considered not to contain fossil resources. The New Idria Serpentine body as defined by the BLM Clear Creek Serpentine ACEC falls under this Class 1 category.

For convenience, the five classes as defined by the PFYC system are provided below:

> ***Class 1*** – **Very Low**: Geologic units that are not likely to contain recognizable fossil remains. The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.
>
> ***Class 2*** – **Low**: Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.
>
> ***Class 3*** – **Moderate** or **Unknown**: Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a Proposed Action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.
>
> ***Class 4*** – **High**: Geologic units that containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases. The probability for impacting significant paleontological resources is moderate to high, and is dependent on the Proposed Action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.
>
> ***Class 5*** – **Very High**: Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation. The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities.

3.14.4 Current Conditions and Trends

The primary causes of paleontological resource damage are road construction, unauthorized collection, wildfires, natural weathering and erosion. The majority of BLM data regarding fossil-bearing rock units in the Hollister Field Office area is focused on lands within the Panoche/Coalinga ACEC. The New Idria Serpentine body within the CCMA is a geologic mass that was once a volcanic intrusion. This nearly

33,000 acre formation was designated by the BLM as the Clear Creek Serpentine Area of Critical Environmental Concern (ACEC) in 1982. As the formation is volcanic in origin, there are no fossil present within the ACEC and none have been scientifically documented to date.

A 1991 study for possible expansion of OHV-based recreation in the CCMA considered twelve planning factors including paleontological resources (USDI 1991:1-3). The report addressed 102,000 acres in the CCMA region that covered Byles Canyon, Larious Canyon, San Carlos Bolsa, Cantua Creek, Joaquin Ridge, White Creek, and Condon Peak (USDI 1991:4). It was determined that there were "no known vertebrate fossil locations in the study area" and the geological formations in the CCMA did not suggest that there could be such fossil locations (USDI 1991:27). Moreover, paleontological resources in the CCMA did "not limit further consideration of OHV recreation" (USDI 1991:27).

Significant vertebrate fossils have been found east of the CCMA Planning Area on private and public lands, primarily in locations associated with the Moreno Shale deposits along Cantua Canyon. Invertebrate fossils have been found in various locations also on private and public lands in Los Gatos Creek Canyon south of the CCMA Planning Area. These fossils are associated with the sandstone formations outside of the Clear Creek Serpentine ACEC.

Fossils are also known to occur throughout the Coalinga and Pleasant Valley areas east of the Planning Area. For example, an unusual single invertebrate fossil specimen was recovered by a volunteer in 2006 on public lands near Black Mountain, east of the CCMA Planning Area.

There have been no requests from researchers or the general public about conducting paleontological studies in the CCMA Planning Area. Consistent with the Clear Creek Management Area RMP Amendment and Route Designation Record of Decision (2006), the identification and protection of all vertebrate and significant invertebrate paleontological localities remains a priority.

3.15 Social and Economic Conditions

3.15.1 Introduction

This section discusses the social and economic environments within the Planning Area and the ways in which public lands and public land resources administered by the Bureau of Land Management (BLM) interact with that environment. The social and economic indicators discussed include demographic factors, employment, and income, as well as some non-quantifiable elements such as quality of life, traditions, and life styles.

3.15.2 Regulatory Framework

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, (Federal Register 1994) requires that disproportionately high and adverse health or environmental impacts on minority and low-income populations be avoided or minimized to the extent feasible. EO 12898 requires Federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health and environmental effects, including the interrelated socioeconomic effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

3.15.3 Regional Setting

Throughout most of the western United States where public lands are located, the resident population within the administrative boundaries of a Field Office is small, and the public land area is often the major component of the total land area. However, the 12 counties in which the HFO public lands are located – Alameda, Contra Costa, Fresno, Merced, Monterey, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, and Stanislaus – have a resident population of over eight million, and the HFO administers only 2.5 percent of the total land area, about 274,000 acres. At 63,000 acres, CCMA comprises almost one-quarter (~23%) of the BLM-administered lands in the region. Other communities within commuting distance from CCMA include residents from Tulare, Madera, San Luis Obispo and Kings Counties.

The large population centers near CCMA have implications for public land management because they represent the potential user and customer base that is within a three-hour drive from CCMA, but they do not provide a useful context for discussion of socioeconomic conditions. The number of people and the size of the economy associated with that population dwarf any of the social and economic contributions that might be made by public land resources. To facilitate discussion of socioeconomic conditions, the local analysis area for this RMP/EIS will be defined as the Central Coast and the Southern Diablo Range – each of which focuses on communities most directly affected by the CCMA RMP/EIS alternatives. The Central Coast analysis area focuses on residents of Santa Clara, Monterey, and Santa Cruz counties; and the Southern Diablo Range analysis area includes San Benito, Merced, and Fresno Counties. San Benito and Fresno counties encompass CCMA and a large block of contiguous BLM public lands in the Southern Diablo Range located west of Interstate 5, north of the town of Coalinga and south of the town of Los Banos.

3.15.4 Current Conditions and Trends

3.15.4.1 Demographics

Table 3.15-1 indicates the populations in the counties within the Planning Area, in California, and in the U.S in the years 1990, 2000, and 2004. The population is large because it includes much of the south San

Francisco Bay Area. Almost a quarter of California's total population resides within the Planning Area. The rate of population growth within the Planning Area was about the same as that for the entire state from 1990 to 2000 but dropped below the State rate after 2000. For both periods, the State and the region

Table 3.15-1 Total Population, by County, in the Planning Area

County	1990	2000	2004	% Change 1990-00	% Change 2000-04
Fresno	670,250	804,333	876,842	20.0	9.0
Merced	179,400	211,245	237,155	17.8	12.3
Monterey	356,797	403,943	425,521	13.2	5.3
San Benito	36,911	53,789	57,353	45.7	6.6
Santa Clara	1,495,296	1,692,759	1,749,365	13.2	3.3
Santa Cruz	229,329	256,488	259,990	11.8	1.4
Total in Area	**2,967,983**	**3,422,557**	**3,606,266**	**13.3**	**5.1**
California	**29,828,496**	**34,098,740**	**36,590,814**	**14.3**	**7.3**
U.S. (mil.)	**248.7**	**281.4**	**293.7**	**13.1**	**4.4**

grew at a faster rate than the nation. Population growth in the 1990s moved at a more rapid pace in the counties surrounding the Bay Area, probably reflecting a move to more affordable residential and commercial property on the part of families and businesses. San Benito County, of which Hollister is the county seat, grew faster than any other county in the Planning Area because, according to most reports, the northern part of the county became a bedroom community for people working in Santa Clara County and beyond.

In rough terms, the population described in the table represents the population within a three-hour drive of the public lands administered by the HFO and thus a pool of potential public land users and customers. Although many of the area residents may not even know BLM lands are located nearby, the sheer size of the pool speaks to the potential demand for public land resources, in particular, recreation resources. Discussions with area residents, public land users, and BLM staff indicate that, in fact, recreationists come from all over California and the U.S. to recreate in CCMA.

The populations of the counties and major cities and towns in the two regional analysis areas are shown in Table 3.15-2. However, the large population statistics from Santa Clara County are not included in any of the remaining tables in this analysis in order to focus directly on the social and economic conditions of the communities most affected by the land use planning decisions in the CCMA RMP/EIS.

The Central Coast has grown at a slower pace than the State and the rest of the HFO for several reasons: driving time to the Bay Area and local housing costs make the area's towns less attractive as bedroom communities, and the closure of Fort Ord in the early 1990s resulted in actual population declines in some communities, notably Seaside and Marina, two towns directly associated with activity at the former Fort Ord. Two places within the Central Coast – Watsonville and the communities in the Salinas Valley – outpaced the average population growth rate of California.

Public lands in CCMA are accessed from the sparsely populated San Benito valley on the west and the San Joaquin valley on the east. The rather large population totals for Merced and Fresno Counties mask the relatively smaller populations in the immediate vicinity of CCMA. Tract data from the 2000 Census indicate that less than 20 percent of Fresno and Merced Counties' one million residents in 2000 lived in the Interstate 5 Corridor just east of the Diablo Range. This analysis area grew far more rapidly than the State average, driven by the growth of Hollister and Los Banos as bedroom communities and population increases in Fresno and other towns in the central San Joaquin valley.

Table 3.15-2(a) Populations of Counties and Major Towns in the Central Coast

County	1990	2000	2004	% Change 1990-00	% Change 2000-04
Monterey	**356,797**	**403,943**	**425,521**	**13.2**	**5.3**
Marina	27,550	21,014	19,165	-23.7	-8.8
Monterey	31,800	29,674	30,314	-6.7	2.2
Salinas	107,600	143,776	152,590	33.6	6.1
Seaside	38,950	31,696	33,386	-18.6	5.3
Santa Cruz	**229,329**	**256,488**	**259,990**	**11.8**	**1.4**
Santa Cruz	48,800	54,593	56,018	11.9	2.6
Watsonville	30,850	44,265	48,041	43.5	8.5
Total	**586,126**	**660,431**	**685,511**	**12.7**	**3.8**

Table 3.15-2(b) Populations of Counties and Major Towns in the Diablo Range

County	1990	2000	2004	% Change 1990-00	% Change 2000-04
Fresno	**670,250**	**804,333**	**876,842**	**20.0**	**9.0**
Clovis	49,650	68,468	81,256	37.9	18.7
Coalinga	8,050	16,213	16,735	101.4	3.2
Fresno	350,700	427,652	458,203	21.9	7.1
Reedley	15,650	20,756	21,849	32.6	5.3
Sanger	16,650	18,931	20,612	13.7	8.9
Selma	14,650	19,444	21,881	32.7	12.5
Merced	**179,400**	**211,245**	**237,155**	**17.8**	**12.3**
Atwater	22,100	23,113	26,594	4.6	15.1
Los Banos	13,750	25,869	30,898	88.1	19.4
Merced	55,700	63,893	70,415	14.7	10.2
San Benito	**36,911**	**53,789**	**57,353**	**45.7**	**6.6**
Hollister	19,000	34,413	36,993	81.1	7.5
Total	**886,561**	**1,069,367**	**1,171,350**	**20.6**	**9.5**

3.15.4.2 Employment and Income

Table 3.15-3 presents employment data for the Central Coast and Diablo Range analysis areas from 1980 to 2002, the last year for which data are available. Table 3.15-4 presents personal income data for the same areas and the same period. Data for all of California and for the U.S. are shown as well for comparison purposes. All values are based on 2002 dollars.

Table 3.15-3(a) Total Employment Central Coast, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Monterey	160,425	202,278	222,474	235,299	26.1	10.0	5.8
Santa Cruz	84,962	125,987	149,579	148,933	48.3	18.7	-0.4
Central Coast	**245,387**	**328,265**	**372,053**	**384,232**	**33.8**	**13.3**	**3.3**

Table 3.15-3(b) Total Employment Diablo Range, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Fresno	275,065	345,726	411,608	427,912	25.7	19.1	4.0
Merced	64,009	77,254	84,576	88,941	20.7	9.5	5.2
San Benito	10,680	15,618	21,604	22,559	46.2	38.3	4.4
Diablo Range	**339,074**	**422,980**	**496,184**	**516,853**	**24.7**	**17.3**	**4.2**
California (Mil.)	**12.8**	**17.0**	**19.6**	**19.9**	**32.8**	**15.7**	**1.3**
U.S. (Mil.)	**114.2**	**139.4**	**166.8**	**167.0**	**22.0**	**19.6**	**0.2**

Table 3.15-4(a) Total Personal Income Central Coast, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Monterey	7,299	10,074	12,638	13,091	38.0	25.5	3.6
Santa Cruz	4,689	6,894	10,462	9,707	47.0	51.8	-7.2
Central Coast	**11,988**	**16,968**	**23,100**	**22,799**	**41.5**	**36.1**	**-1.3**

Table 3.15-4(b) Total Personal Income Diablo Range, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Fresno	12,102	15,534	18,416	19,544	28.4	18.6	6.1
Merced	2,811	3,759	4,319	4,640	33.7	14.9	7.4
San Benito	350	900	1,631	1,598	157.1	81.2	-2.0
Diablo Range	**14,913**	**19,293**	**22,735**	**24,184**	**29.4**	**17.8**	**6.4**
California (mil.)	**621,037**	**892,291**	**1,153,201**	**1,154,685**	**43.7**	**29.2**	**0.1**
U.S. (mil.)	**5,017,671**	**6,692,137**	**8,798,671**	**8,900,007**	**33.4**	**31.5**	**1.2**

Table 3.15-4(c) Per Capita Personal Income Central Coast, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Monterey	24,961	28,176	31,357	31,842	12.9	11.3	1.5
Santa Cruz	24,769	30,024	40,904	38,323	21.2	36.2	-6.3
Central Coast	**25,049**	**28,949**	**34,978**	**33,830**	**15.6**	**20.8**	**-3.3**

Table 3.15-4(d) Personal Income Diablo Range, 1980 to 2002

Area	1980	1990	2000	2002	% Change 1980-90	% Change 1990-00	% Change 2000-02
Fresno	23,378	23,106	22,962	23,492	-1.2	-0.6	2.3
Merced	20,726	20,889	20,406	20,623	0.8	-2.3	1.1
San Benito	19,182	24,432	30,286	28,660	27.4	24.0	-5.4
Diablo Range	**22,972**	**22,707**	**22,386**	**22,773**	**-1.2**	**-1.4**	**1.7**
California	**26,092**	**29,783**	**33,918**	**32,989**	**14.1**	**13.9**	**-2.7**
U.S.	**22,081**	**26,809**	**31,182**	**30,906**	**21.4**	**16.3**	**-0.9**

For both analysis areas, the data demonstrate that economic change varies greatly from State and national trends but also varies within the analysis areas themselves. This is not surprising given the size of the areas and the diversity of terrain and history within them, but this makes it difficult to make generalizations about the areas.

Employment growth in the Central Coast analysis area seemed to mirror the rate for the State, but the experiences of Santa Cruz and Monterey Counties were quite different. Santa Cruz employment growth was very rapid in the 1980s, began to slow down in the 1990s, and has recently been stagnant. Monterey's employment growth lagged that of the State in the 1980s, slowed down in the 1990s, but then became robust in the first few years of this century.

In the Diablo Range analysis area, average employment growth lagged behind the State rate in the 1980s, began to outpace it in the 1990s, and grew much more rapidly from 2000 to 2002. These averages, however, mask the continuing very high rate of growth in San Benito County for the entire 22-year period, the fact that Merced lagged behind the State growth rate until recently, and that Fresno County has maintained steady growth throughout this period.

California's per capita income grew at a slower rate than the U.S. average between 1980 and 2000 and declined faster between 2000 and 2002. Consequently, the gap in 1980 between California's very high per capita income and the U.S average has narrowed considerably. The same trend has been followed in the Central Coast area despite a surge in personal income in Santa Cruz County in the 1990s. The Diablo Range area represents an anomaly in that per capita income has declined since 1980. A per capita income that was slightly higher than the U.S. average is now less than 75 percent of the national average.

3.15.4.3 Environmental Justice

The requirements for environmental justice review during the environmental analysis process were established by Executive Order 12898 (February 11, 1994). That order declares that each Federal agency is to identify "disproportionately high and adverse human health or environment effects of its programs, policies, and activities on minority populations and low-income populations."

Table 3.15-5 describes the results of the 2000 U.S. Census with regard to ethnicity and poverty in the counties that make up the Central Coast and Diablo Range analysis areas. Most of the counties share the same general ethnic patterns that the State of California exhibits – a very large Hispanic population, ranging from 25 to 50 percent of the population; distinct minority populations of African Americans, generally comprising less than 5 percent of the population; Asian/Pacific Islanders, comprising between 5 and 10 percent of the population; and a very small Native American population. There are no federally recognized Native American tribal lands within the Planning Area. Santa Cruz is the county that least represents the State ethnic pattern, with minority populations that are all below the State average.

The percent of the population with personal income below the poverty level is extremely high in both Fresno and Merced Counties, over 20 percent of the population. With the very low and declining real per capita income shown for these counties in Table 3.15-4, these poverty levels are not surprising.

Table 3.15.5(a) Percent Ethnicity and Poverty Level, Central Coast, 2000 Census

County	Hispanic	African American	American Indian	Asian-Pacific	Percent Below Poverty Level
Monterey	46.8	3.7	1.0	6.4	13.5
Santa Cruz	26.8	1.0	1.1	3.5	11.9
Area Total	**39.0**	**2.9**	**1.1**	**6.2**	**12.8**

Table 3.15.5 Percent Ethnicity and Poverty Level, Diablo Range and Statewide, 2000 Census

County	Hispanic	African American	American Indian	Asian-Pacific	Percent Below Poverty Level
Fresno	44.0	5.3	1.6	8.2	22.9
Merced	45.3	3.8	1.2	7.0	21.7
San Benito	47.9	1.1	1.2	2.6	10.0
Area Total	**44.0**	**4.9**	**1.4**	**8.3**	**22.0**
California	**32.4**	**6.7**	**1.0**	**11.2**	**14.2**

3.15.4.4 BLM Contribution to the Local Economy

Recreation

Although no management decisions for public lands outside the CCMA will be part of this planning effort, these areas may be referred to here to provide a more complete discussion of the socioeconomic role of recreation on public lands in the Planning Area. These include other public lands administered by the BLM, Forest Service, the National Park Service, and California State Parks.

The major share of recreation use in the CCMA is concentrated in the Serpentine ACEC, with over 78,000 visits in 2006 and 2007 combined. Together they account for over 70 percent of the recreation use on public lands in the Planning Area. (See Section 3.8, "Recreation," for a more extensive treatment of recreation use). There are two semi-developed campgrounds in the CCMA that traditionally receive the majority of visitor use from October to May. Compared to the recreation requirements of the millions of people who reside within 2 hours of other major blocks of public lands in Central California, the use of CCMA public lands is inconsequential. The same is true for expenditures related to recreation on CCMA public lands.

The California Department of Parks and Recreation recently commissioned a study that was conducted by California State University, Sacramento's Department of Recreation, Parks and Tourism Administration from 2007 to 2009. The preliminary findings of the study report that 74.9 million people visit California

state parks annually, spending an average of $4.32 billion per year in park-related expenditures. About half of this amount is related to recreation on the California Coast, which means the other half of all of the expenditures were made in other regions including the Coast Ranges, Sierra-Nevada, and the California Desert.

The amount of spending within the CCMA would not be significant given size of the Diablo region and its economy. However, recreation on public lands in CCMA is still very important to many sectors of the local economy, and to the many individuals who recreate there. The motorcycle shops in Hollister rely heavily on off-highway vehicle recreation opportunities in CCMA, which along with Hollister Hills SVRA, is a primary local OHV resource. Several shop owners indicated a very heavy reliance on OHV at CCMA. In addition to hosting several major national events such as the Quicksilver and Wild Boar enduros, the area is close enough to several hundred thousand residents that it is a popular weekend recreation area. On weekends, the area draws visitors from several hours away for a variety of motorized and non-motorized recreation activities.

Other forms of recreation at CCMA include hunting, rock-hounding, and hiking. The area is highly valued by these visitors as well as the OHV community because it is nearby, because it offers varied terrain, and because there are no comparable properties that allow public access in the vicinity. The CCMA is also frequently said to be valued as a place to get away from the stress of population and traffic.

One segment of the local community, however, appears to experience a direct economic benefit from recreation on BLM public lands in the Diablo Range, and CCMA in particular. Private landowners with large ranches who live adjacent to large tracts of public land in the Diablo Range charge hunters for access to their own private land and to adjacent BLM land (Moore 2005). These charges are often in the form of membership fees in hunting clubs that provide lodging or camping sites and a variety of support features in addition to access.

Hunting is an important recreation activity on public lands in the Diablo Range. Upland game birds (chukar, quail), black-tailed deer, and wild pig are all hunted there. The southern part of the Range is in an area called "the pig triangle" (King City to Paso Robles to Coalinga) because of the number of pigs taken there every year. Hunters come here from throughout the state, and they purchase some supplies and equipment locally in support of their hunting. However, the only economic sector that clearly benefits from hunting in the Diablo Range is the hunting clubs.

Many of the ranchers that benefit financially from managing hunting clubs and providing access also hold BLM grazing leases. Several of the smaller ranchers who participate in this indicated that the benefit from hunting-related activities exceeded that from grazing. Land values in the Diablo Range have risen in recent years beyond their potential to produce income from grazing. It may be that the potential of these lands as hunting areas was an element in the increase in value.

Beyond any financial contribution, the public lands in the Central Coast and Diablo Range, like those in CCMA, provide places for local residents and others to get away from the very densely populated communities in this part of California. The area is accessible for day trips to the more than 8 million residents of the Bay Area and the Central Valley, and it provides a sense of isolation that is difficult to find elsewhere in the region.

OHV Recreation

According to a 1993-1994 report prepared by the California Department of State Parks and Recreation Off Highway Motor Vehicle Recreation (OHMVR) Division titled, "*Off Highway Vehicle Recreation's $3 Billion Economic Impact in California & A Profile of OHV Users: A Family Affair*", expenditures by OHV users for equipment, activities and events generated about $3 billion in economic activity in 1992,

and supported 43,000 jobs. The OHMVR Division estimated there are some 100,000 miles of roads and trails, on more than 200 county, state and federal sites, open to OHV use; and approximately 3.5 million people, 14.2% of California households, participated in OHV activity statewide in 1992.

The report also concluded that rural communities, places that often need it the most, realize much of the economic benefit. In particular, the report detailed the benefits to San Benito County from OHV recreation at Hollister Hills SVRA from 1992-1993, including 85,000 visitors with an economic impact totaling $4.1 million and over 100 jobs attributable to OHV recreation.

During this RMP/EIS effort, BLM evaluated statistics from the US Census 2000 data and a 2009 study prepared by Dean Runyan and Associates, Inc. for the California Travel and Tourism Commission to determine impacts of travel expenses by county in California. Although BLM has not estimated the economic benefits generated from recreation-related expenditures by visitors to the CCMA alone, the majority of CCMA public lands are in southern San Benito County; and the data shows that travel and recreation in San Benito County generate some $78,300,000 in spending in the county, $25,300,000 in earnings, and 940 jobs in the county (directly and indirectly). This amount ranks San Benito number 47 of 58 counties with revenues generated and number 52 of 58 counties with jobs created from travel and recreation tourism (Dean Runyan Associates, Inc. 2009). The growth in jobs for the travel and recreation-related sectors since 1992 has been less than 100. Jobs related to travel and recreational tourism account for 5.7 percent of all jobs in San Benito County.

Much of the economic benefit for income and employment, from people's expenditures for motorized recreation, appears closer to the urban homes in the visitor-shed, than in the communities near the CCMA. Other factors that influence economic conditions are associated with restaurants, lodging, and gas stations where visitors spend money traveling to and from the CCMA. Purchases of vehicles for recreation use are prime examples of big-ticket expenditures that occur at considerable distances from the CCMA, although several notable retail motorcycle and OHV businesses are located in San Benito County.

In particular, motorcycles are popular vehicles for motorized recreation in the CCMA. The US Census Bureau 2001 Zip Code Business Patterns (http://censtats.census.gov/cbpnaic/cbpnaic.shtml) provide information by zip code, for the number of businesses and categories of numbers of employees at these businesses. The pertinent North American Industry Classification System (NAICS) category 441221 covers vendors of all-terrain vehicles, mopeds, motorbikes, motorcycles, and motorcycle parts and equipments, both new and used.

Also, California State Parks and Recreation commissioned a study by ICF International titled, "Estimating the State Fuel Tax Paid on Gasoline Used in the Off-Highway Operation of Vehicles for Recreation", which was completed in September 2006. The ICF report developed estimates on the amount of fuel used for off-highway vehicle (OHV) recreation on public lands in California, as well as providing information on the geographic distribution of OHV users and the numbers of off-highway vehicles used for recreation.

The ICF study was prepared to assist the Department of Transportation (DOT) and the OHMVR Division with decisions regarding transfers of fuel tax funds to the Off-Highway Vehicle Trust Fund (OHVTF). California State Parks funded the study because of concerns over the existing Fuel Tax Transfer Model, which is derived from two surveys carried out by Tyler and Associates in 1989-1990.

The OHVTF is administered by the OHMVR Division of California State Parks and Recreation, and is used for the acquisition, development, and maintenance of off-highway recreation facilities and opportunities as well as the protection of natural and cultural resources associated with off-highway recreation.

Findings from the ICF survey were compared to those presented in the 1990 Study. The results suggest the number of households that drive off-highway for recreation decreased from 13.6% in 1989 to 9.9% in late 2003. Another objective of the study was to determine whether people are using their OHVs for recreation, or to gain access to a recreational pursuit. According to ICF, over half of the respondents claimed to "drive off-highway for the fun of it", and to gain access for some other recreational pursuit. One-third of respondents indicated that they only drive off-highway to gain access to a recreational pursuit other than OHV recreation, and less than 15% reported OHV use strictly for recreational purposes.

Perhaps the most important objective of the study was to determine the amount of non-registered OHVs in California. The results of the ICF study show the ratio of non-registered to registered vehicles has dropped significantly from 1990. The decrease in non-registered vehicles has been attributed to efforts by retail dealerships that now aid purchasers in registering their vehicles with DMV, and new enforcement programs that began following the results of the 1990 study, as well as amnesty programs with DMV to create incentives for non-registered vehicle owners to register their OHVs. A comparison of the estimated non-registered vehicles in 1989 and estimated non-registered vehicle in 2003 shows a major decline in off-highway motorcycles.

As noted in their conclusion, "The ICF International Study provides a significant improvement in the data used for estimating the amount of gasoline used for recreation on public lands in California." The ICF International Study also improved vehicle counts by vehicle type. Significant miscounting of registered ATVs as "motorcycles" in the Existing Tax Transfer Model resulted in overestimation of non-registered vehicles.

By correcting counts of vehicle types, the study identified an overestimation of approximately 1.4 million vehicles from the 1990 data. In addition, a significant increase in 4WD vehicles was observed by taking into account vehicle models that had been produced since 1990 when the Existing Tax Transfer Model was developed. Overall, the ICF report estimates that California use approximately 151,000,000 gallons of gasoline recreating off-highway on public lands and the total tax revenue from the purchase of fuel alone generates almost $28,000,000 for the State, which represents less than 50% of the total tax revenue reported in the 1990 study (ICF 2006).

Grazing

Although no management decisions for public lands outside the Clear Creek Management Area will be part of this planning effort, these areas may be referred to here to provide a more complete discussion of the socioeconomic role of livestock grazing on public lands in the Planning Area.

The BLM manages long-term grazing leases on 57,633 acres of public land in the Planning Area, providing 7,547 animal unit months (AUMs) of forage annually. As noted in Table 2.4-7, these leases include public lands outside of CCMA. All of the grazing is done by cattle operations, and all of the forage provided annually is in the Diablo Range area. (See Section 3.11, "Livestock Grazing" for a more extensive treatment of public land grazing.) At the current average California private land lease rate for livestock grazing land ($14.50/AUM), the annual forage contribution from CCMA public lands is valued at just over $109,000.

The forage provided annually by BLM-managed lands in the Diablo Range amounts to less than 0.1 percent of the total livestock forage requirements of the three counties that make up the analysis area, and there is no forage contribution in the Central Coast area. In general terms, the economic contribution of public lands in the Planning Area to the livestock economy of the Diablo Range analysis area is negligible. However, that is not the case when individual economic units are considered.

The three largest leaseholders authorized for grazing on public lands in the CCMA lease from 1,036 AUMs to 2,914 AUMs annually. These leaseholders account for almost two-thirds of the acres leased by the HFO in the CCMA and for over 80 percent of the AUMs. On average, 45 percent of the acreage they graze is public land. That figure serves as an indicator of the degree of importance public lands hold for these individual grazing operations. Moreover, for the remaining 8 smaller leaseholders, public lands make up 25 to 50 percent of their grazing acreage. Most of these smaller lessees may not be viable economic units, but their grazing operations likely yield some supplemental income, and public lands clearly are important to that supplement.

Minerals

The Federal mineral estate in the southern portion of the Diablo Range has historically been a source of both oil and natural gas, though nearly all of the production in Fresno and San Benito counties has been outside of CCMA. Moreover, production in the entire region has declined in the recent past, and the potential for oil and gas development in CCMA is extremely limited given more reasonably foreseeable energy and mineral development on other lands. In 2004, annual production in the entire Hollister Field Office stood at 585 million cubic feet (mmcf) of natural gas and 50,500 barrels of oil. Both of these figures are less than 2/100 of a percent of annual production of natural gas and oil in California. Although important at one time, the production of asbestos, bentonite, and mercury from public lands has ceased and is unlikely to start up again. (See Section 3.12, "Energy and Minerals," for a more extensive treatment of mineral extraction in the CCMA)

Public Revenue

Public land management activities and resource uses contribute only marginal revenues to local and State governments, based on the very limited Federal revenue from grazing fees, oil and gas royalties, and fees for recreation special use permits. Payment in Lieu of Taxes (PILT) based on BLM land ownership in the entire 12 county Hollister Field Office, contributed about $225,000 to local government revenues in 2004, which comprises a very small portion of these governments total revenues. As with other quantifiable economic indicators such as personal income, the public land resources in the CCMA are simply too small relative to other public revenue generators to make a significant contribution.

3.15.4.5 Other Socioeconomic Contributions of BLM Lands

In addition to the contribution of public land resources to local income and employment, other socioeconomic elements that are more difficult to quantify are affected. Especially in areas of the western U.S., where BLM lands make up the majority of the land base, public land resources may have a distinct effect on the lifestyles, quality of life, and traditions of a community. Since data on these types of socioeconomic indicators are not gathered in any regular and systematic way by a governmental entity, the analysis in this section is based on comments received by BLM over many years regarding CCMA from knowledgeable local individuals, government employees, and businessmen.

Considering these issues involves a review of the economic and social conditions described in the sections above, and acknowledging the broader context of socioeconomic indicators, and understanding the importance of things such as quality of life, community traditions, and lifestyles, and how they would be affected by land use alternatives in the CCMA RMP.

Several focal points emerged from the scoping meetings. comments, and discussions with public land visitors, including the potential utility of public lands as a way to connect Native Americans with their ancestral lands; the role that public lands play as a place to escape, to experience remoteness, and to have an unstructured outdoor experience; the place that public lands in the Diablo Range serve in linking

modern day residents with traditional lifestyles; and the use of public lands as a mitigation pool for endangered species habitat.

A recurrent theme in most discussions of public lands in the CCMA was their function as a place to escape, to get away from the stress of population. Visitors to CCMA from the Bay Area must drive several hours, but then may spend an entire day riding, hiking, or rockhounding without seeing another person. An important element of this feeling of escape is that experiences on public lands are far less regulated, far less structured, than those at other recreation sites. There are a number of State Parks in the Planning Area, for example, but they are heavily used, sometimes requiring reservations, and often with a single focus, such as motorcycling, that requires intense regulation to manage its use safely. The downside to the remoteness of areas such as the CCMA is that many illegal activities such as poaching, trespassing, and marijuana cultivation are more prevalent.

Public comments referred repeatedly to the link between public lands in the CCMA and traditional lifestyles and practices. Many of the current grazing leaseholders are descended from the original homesteaders. Although few of these people derive their financial livelihood from public lands today, they still place great value on grazing cattle where their fathers and grandfathers did, and on hunting the same hills and canyons that their family has hunted for generations.

OHV Recreation and Family Values

Since 1984, the classic stereotype of an OHV recreationist does not reflect the growing popularity of the sport, as public lands are now host to visitors of all ages including families, women, children, and octogenarian riders who enjoy OHV use on public lands.

Increasingly, recreational use of OHVs is a social sport, with most visitors coming in groups. The 1993-1994 California State OHMVR Division study describes how motorcycle clubs and OHV user associations often function as extended families, with families, singles, and couples all traveling together to enjoy the sights and camaraderie associated with outdoor recreation on public lands. In 1992, the OHMVR Division determined that 82% or more of the OHV-owning households had two or more drivers per household.

The importance of family-oriented recreation identified by the OHMVR Division is emphasized in the findings of a 1993 Statewide User Survey Analysis that emphasizes the physical, emotional, and mental benefits of outdoor recreation activities. This California State Parks report states, "Recreation has the potential to be a major balancing factor in peoples' lives. Depending on the specific recreation or activity chosen, users can seek either excitement or relaxation through recreation. Participation in group outings builds an understanding of team work and provides a positive group affiliation. Family recreation strengthens the solidarity of the family unit." These same values are reflected in public visitor use and enjoyment of CCMA, as local clubs and organizations sponsor numerous annual family events on public lands.

Public Health and Safety

Besides preserving and protecting natural and cultural resources, BLM's stewardship role extends to protecting public health, safety, and property. The Bureau is responsible for maintaining facilities and infrastructure, reducing health and safety risks to employees and the public, and protecting public lands from hazardous materials releases, illegal dumping of wastes, theft and destruction of Federal property, misuse of resources, and wildland fires.

In CCMA, releases of hazardous substances can have a significant impact on the health, diversity, and productivity of the public lands as well as on the health and safety of individuals who utilize and work on

those lands. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), provides BLM's authority and identifies agency responsibilities when responding to sudden releases of hazardous substances affecting public lands, or from historic disposal or release sites associated with abandoned mine lands that continue to pose a risk the overall protection of the environment and human health.

CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986. SARA expanded the federal government's response authorities and clarified that federal facilities are subject to the same CERCLA requirements as private industry. Under Section 120 of CERCLA, each department, agency, and instrumentality of the United States is subject to, and must comply with, CERCLA in the same manner as any nongovernmental entity. Generally, funds from the Superfund do not go towards paying for the cleanup of releases from federally-owned facilities [Section 111(e)(3)].

Historically, approximately 80 percent of all hazardous substance releases on public lands in CCMA were related to mines and mill sites. The other 20 percent have been caused by illegal activities, such as illegal dumping, industrial wastes, and illicit drug production. In recent years, marijuana cultivation has increased substantially, introducing even more fertilizers and toxic wastes into regions not previously plagued by this problem, as well as previously located encampments.

The National Contingency Plan (NCP) establishes the processes and procedures used by lead agencies to respond to releases of hazardous substances pursuant to CERCLA. The NCP is published in the Code of Federal Regulations (CFR) under 40 CFR 300. As the lead agency responsible for releases on CCMA public lands, BLM must ensure that any investigatory or cleanup action taken pursuant to CERCLA, in response to a release of a hazardous substance affecting public lands, is in accordance with the NCP.

3.16 Visual Resource Management

3.16.1 Introduction

BLM lands in the Planning Area were inventoried for scenic quality in 1979. These inventories were used in the 1984 Hollister RMP when the public lands were assigned to one of four visual resource management (VRM) classes, and scenic quality has not been reassessed to date. However, public lands in CCMA are known for the outstanding scenic quality, as numerous peaks and ridge routes in the area provide unparalleled views of Central California. In particular, San Benito Mountain is the highest peak in the Southern Diablo Range and boasts a vista that spans the entire San Joaquin Valley and Coast Ranges. Other locations to be considered with regards to visual resources management classifications include Tucker Mountain, Goat Mountain, Santa Rita Peak, Condon Peak, and Wright Mountain.

3.16.2 Regulatory Framework

Visual resources on BLM land are regulated by the guidance provided in the BLM Handbook H-8410-1. The visual resources of an area are inventoried and then assigned to a class by rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. Visual resource classes are defined as follows:

Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low and not attract the attention of a casual observer.

Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate and may attract the attention but should not dominate the view of the casual observer.

Class IV Objective: To manage activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high and may dominate the view and be the major focus of the viewer's attention.

3.16.3 Regional Setting

The CCMA consists of contiguous lands and isolated parcels spread across the rugged, mountainous terrain, although it is generally surrounded by low-elevation, rural ranching areas located in the nearby valleys. Elevations range from 1,000 to more than 5,000 feet. Modifications of public lands typically consist of visitor use facilities and range improvements such as fence lines and wildlife guzzlers. Electrical transmission lines, radio communication sites (including buildings and towers), and fuelbreaks are also located on BLM lands in CCMA.

3.16.4 Current Conditions and Trends

3.16.4.1 Overview of Management Zones

Approximately half of the BLM public lands in CCMA lie within the Serpentine ACEC. Visual resources in the Serpentine ACEC include expansive views of California's Central Valley, as well as the Sierra-Nevada and Coast Ranges. Scenic values in the Tucker, Condon, Cantua, and San Benito River management zones, emphasize other distinct watershed features associated with the New Idria serpentine mass, San Carlos Bolsa, Tucker Mountain, Condon Peak, White Creek, the San Benito River, and Hernandez Valley.

BLM public lands in the Cantua Zone are also highly visible from U.S. Interstate 5. Scenery in this area is typical of the grassy hills along the western edge of the San Joaquin Valley, and therefore is an important visual resource. From the Ciervo Hills, west of the I-5 corridor, two large communication sites are visible on the ridgeline but they do not dominate the landscape, which is characterized by annual grasslands and scattered California junipers.

BLM lands in the San Benito River Zone are generally inconspicuous, although they are visible from Coalinga Road. Also, this zone includes Goat Mountain, which has been identified as preferred location in CCMA for recreational hang-gliding because of the prevailing wind patterns and ideal topography.

The Condon Zone includes BLM-managed properties that share boundaries with two significant California State Lands Commission holdings. Neither of these two areas has been assigned VRM class designations at the time of this report.

Of course, the predominant feature in the Southern Diablo Range is Joaquin Ridge, culminating at Joaquin Rocks, and Black Mountain. These arid foothills in the rain shadow of the Diablo Range are characterized by annual grassland/shrub vegetation and the steep chaparral and oak-covered slopes of the Diablo Range. Although Joaquin Ridge and Joaquin Rocks are outside the CCMA RMP 'planning area', BLM will consider potential effects on these resources in the CCMA RMP.

In the Tucker zone, public lands have limited non-motorized access, but are visible from Hernandez Valley and Vallecitos. The topography in this area is typical of the inner central coast range, with steep, rugged canyons, sandstone cliffs, and escarpments. Vegetation in this region is typically mixed chaparral and chamise chaparral. There are some areas of oak savannah and oak woodland, especially in canyon bottoms and on north-facing slopes.

Table 3.16-1 identifies the VRM Class standards that are currently applied to lands managed by the HFO.

Table 3.16-1 Existing VRM Designations

Management Zone	Current Decision
Serpentine ACEC, Tucker, Cantua, San Benito River	Class IV, unless otherwise stated. Limit communication facilities to existing sites. Utility corridors are established along utility rights-of-way.
Condon Zone	Class III in the Condon Peak area. Limit communication facilities to existing sites. Utility corridors are established along utility rights-of-way.
San Benito Mountain RNA and WSA	Class I No expansion of existing sites in the RNA. Utility corridors are established along utility rights-of-way.

3.16.4.2 Visual Resources Inventory

BLM's analytical process for VRM identifies, sets, and meets objectives for maintaining scenic values and visual quality. Once inventoried and analyzed, lands are given relative visual ratings (visual resource classifications). VR class ratings are derived from an analysis of scenic quality rated by landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. A

determination of viewer sensitivity levels to changes in the landscape, and the distances that visual quality can be seen across a landscape, in order to determine an appropriate VRM Class objective.

Management Classes describe the different degrees of modification to the basic elements of the landscape (form, line, color, texture) that would be allowed from BLM management in CCMA. When a site-specific project is proposed, the degree of contrast between the proposed activity and the existing landscape is measured (Contrast Rating). The Contrast Rating process compares the proposed activity with existing conditions element-by-element (form, line, color, texture) and feature-by-feature (land/water surface, vegetation, structures). The Contrast Rating is compared to the appropriate Management Class to determine if contrasts are acceptable. If the proposed project exceeds the allowable contrast, a BLM decision is made to (1) redesign, (2) abandon or reject, or (3) proceed, but with mitigation measures stipulated to reduce critical impacts.

Currently, only the San Benito WSA and Research Natural Area are managed as VRM Class I areas, where only natural changes from ecological processes and very limited management activity are allowed, and contrasts within the landscape are designed to avoid attracting attention.

All other BLM public lands within CCMA are managed as VRM Class 4 areas, which allows contrasts within the landscape that attract attention and could be dominating features in terms of scale, but still attempts to repeat the form, line, color, and texture of the characteristic landscape.

The CCMA visual resource management classification process included an identification of cultural modifications in the landscape and an evaluation of the effects of those modifications on character and quality. The trend in scenic quality since most of the visual resource assessment work was done in 1979 has been relatively stable and unchanging in terms of landscape character and scenic quality. Much of this can be attributed to the amount of rough terrain throughout the Planning Area, coupled with lack of water, which were seen to be hindrances to development.

However, OHV use has increased over the past thirty years, and the resulting impacts to scenic qualities are highly visible in Clear Creek Canyon, and are expected to continue to increase in designated vehicle use areas within CCMA. Due to the degree of cultural modification (particularly surface area disturbance) observed over the period, HFO determined that the scenic quality of certain areas may have been reduced as a result of the cultural modifications. As a result, BLM is considering revised VRM Classes for certain areas as part of this RMP/EIS process including the Serpentine ACEC and the Condon management zone. A brief discussion of these areas follows.

Serpentine ACEC

The Serpentine ACEC encompasses both the San Benito Mountain RNA (4,147 acres) and WSA (1,500 acres). It was designated as VRM Class IV in the 1984 Hollister RMP. Rugged terrain, inclement weather conditions limit visitor use during summer and winter months. The existing character of the landscape is mostly retained, although the level of visual contrast is high in many areas due to historic timber harvesting, mining operations, and road construction. Since 2006, HFO has observed lower levels of surface disturbance from OHV use on designated routes, and the presence of the San Benito Mountain RNA and WSA are valid reasons for reconsideration of the ACEC management as VRM Class II rather than IV.

Condon Zone

This management zone includes the Condon Peak/White Creek area located northwest of Coalinga, to the north of Coalinga-Los Gatos Road. It was designated as VRM Class III in the 1984 Hollister RMP. Scenic quality is moderate to high and very minimal impacts from surface disturbance or other visual contrast are visible from primary viewing routes. Existing conditions warrant retention of the Class III designation. However, the potential for increased use of this area for OHV recreation, hunting, camping, and fuelbreaks warrant consideration of Condon zone management as VRM Class IV rather than III because of impacts associated with these surface disturbing activities.

This area also abuts the CCMA's southern boundary and portions of it receive moderate vehicular traffic associated with private landowners and numerous clubs and organizations accessing CCMA public lands from Coalinga-Los Gatos Road, as well as law enforcement and military activities, which are expected to increase into the future.

The range of alternatives for VRM classification of these areas is described and analyzed in Chapters 2 and 4, respectively.

3.17 Fire Management

3.17.1 Introduction

Fire risk is the probability that wildfire will start from natural or human-caused ignitions. Fire hazard is the presence of ignitable fuel coupled with the influences of terrain and weather. The nature of fuels, terrain, and weather conditions combine to dictate fire behavior, rate of spread, and intensity. Wildland fuel attributes refer to both dead and live vegetation and include such factors as density, bed depth, continuity, loading, vertical arrangement, and moisture content. In the wildland urban interface (WUI), structures are also potential fuel. Fire tends to burn more rapidly and intensely upslope than on level terrain. Also, weather conditions such as high ambient temperatures, low relative humidity, and windy conditions favor fire ignition and erratic fire behavior. The Hollister Field Office (HFO) strategy for wildfire management is to reduce the risk of unwanted fire in the Planning Area by managing wildland fuel and reducing human-caused ignitions. To develop the most effective management strategy, the Planning Area is divided into eight fire management units (FMU) based on geography and fuel type (see Map 6 in Appendix I). The FMUs differ in fuel type, acreage, and land use (see Table 3.17-1).

Table 3.17-1 Fire Management Units (FMU) in the Planning Area

Fire Management Unit	Type	Dominant Vegetation/Fuel	BLM acres in CCMA
San Benito Natural Area	Special Management Area	Southern Ultramafic Jeffrey Pine Forest (also referred to as the "San Benito Forest" [Kuchler, 1997], comprising a Jeffrey-Coulter-foothill pine and incense cedar association), and Serpentine Chaparral (more specifically leather oak [*Quercus durata*] chaparral)	4,147
Clear Creek Serpentine ACEC	Area of Critical Environmental Concern	Serpentine Barrens, Serpentine Foothill Pine-Chaparral Woodland	30,300
Hernandez Valley	Wildland Urban Interface	Non-Serpentine Foothill Pine-Chaparral Woodland, Chamise Chaparral, Valley Oak Savannah, Blue Oak Savannah, and Non-Native Grassland	5,000
San Joaquin Valley South	Special Management Area	Annual grassland and shrub with steep chaparral and oak-covered slopes	14,500
San Joaquin South Continued	Special Management Area	Annual grasses and herbaceous forbs with few scattered California Juniper	6,500

Source: HFO Fire Management Plan (2008).

3.17.2 Regulatory Framework

The Bureau of Land Management (BLM) is responsible for wildland fire and fuel management in the Planning Area. The HFO, under a mutual aid agreement with the California Department of Forestry and Fire Protection (CALFIRE), provides appropriate management response (AMR) for all wildland fires within the HFO. CALFIRE is responsible for actual fire suppression on HFO lands. The HFO currently manages wildland and prescriptive fire through the 1984 Hollister RMP and 2008 Fire Management Plan (FMP).

3.17.3 Regional Setting

Historically, managing wildland fire for multiple objectives has not been emphasized to achieve management goals on public lands administered by the Hollsiter Field Office. The goal is to suppress all wildfires involving less than 10 acres 90 percent of the time. Prescribed fire and non-fire fuels treatments, including mechanical, biological, and chemical, are implemented as appropriate to create fire-safe communities, protect private property, achieve resource management goals, and restore ecosystem health.

3.17.4 Current Conditions and Trends

3.17.4.1 Historic Fire Patterns

The natural (historic) fire regime for the Planning Area is characterized by low-intensity surface fires with a recurrence frequency of less than 35 years. A historic fire regime is the natural role of fire across a landscape and the practice of Native American burning in the absence of modern human intervention (Agee 1993; Brown 1995). Fire managers define five natural (historical) fire regimes that are classified based on the average number of years between fire recurrences combined with its severity to the dominant vegetation (Schmidt et al. 2002). Severity is judged on the damage caused to vegetation. For example, a stand replacing fire completely burns the dominant overstory vegetation and is consider a severe fire. Based on the Schmidt et al. classification, the historic natural recurrence of fire for ecosystems in the Planning Area is Fire Regime Class I, which includes surface fires with a recurrence of 0 to 35 years and low to moderate severity.

Natural and human-caused fire has long been an integral part of vegetation communities in the Planning Area. Lightening-ignited fire is a natural component of central California ecosystems, and its occurrence is important to maintaining the health of rangeland ecosystems. Native Americans used fire for such things as hunting, improving wildlife habitat, land clearing, and warfare. As such, many of the plant species and communities within the Planning Area are adapted to recurring fire through phenological, physiological, or anatomical attributes. Some plants that occur in the Planning Area (e.g., chaparral shrub species) require recurring fire to persist.

However, the migration of European settlers into the area changed the natural fire regime in several interrelated ways, directly in response to changes in human intervention (Agee 1993; Brown 1995). The nature of vegetation (fuel) changed due to land use practices such as homesteading, livestock grazing, agriculture, water development, and road construction. Livestock grazing reduced the amount of fine fuels such as grasses and forbs, which carried fire across the landscape. In addition, continuous stretches forest and rangeland fuels were broken up by land-clearing activities. The removal of the natural vegetation allowed introduced weedy plants to colonize and occupy – in many instances – large expanses of land. The annual grasslands of central California are an example. Many of these weedy plants become flashy fuels as they age, causing fires to burn faster and hotter than with normal wildland fuels. In addition, more than a century of fire-suppression policy resulted in an unusually large accumulation of hazardous fuels in many rangeland ecosystems. The presence of flashy fuels coupled with the large accumulation of naturally occurring fuels has created hazardous situations for public safety and fire management.

Modern-day land managers continue the use of fire in the Planning Area by using prescribed fire as a tool to improve wildlife habitat, control noxious weeds, or reduce hazardous fuels. Their primary efforts in managing fuels and fire are to protect human life, economic values, and ecological values. An example is a WUI, which occurs where forest or rangeland vegetation intermixes with human structures and values. Proactive and vigilant fire and fuels management in the Planning Area is necessary to protect the WUI and its associated economic and ecological values from fire loss.

3.17.4.2 Recent Fire History

Fires have regularly occurred in the Planning Area, with several fires burning thousands of acres. (see Table 3.17-2). Fires occur an average of four times per year, and approximately 85 percent are caused by humans. This level of human-caused fire is of concern to the HFO because of the threat it poses to WUI communities and other economic and ecological values important to the residents of central California.

Table 3.17-2 Fires Occurring within the HFO for the Years 1980 through 2008

Fire Management Unit	Fire Number	Largest Fire (acres)	Average Fire Size (acres)	Total Area Burned (acres)	Ignition Cause	
					Lightening	Human
San Benito Natural Area	2	150	76	152	1	1
Clear Creek Serpentine ACEC	2	1	0.6	1.1	2	0
San Joaquin Valley South	10	18,340	1,972	19,724	1	9
San Joaquin South Continued	19	7,800	1,082	20,560	3	16
Hernandez Valley	18	2,797	519	9,339	3	15

Table 3.17-3 presents an overview of the values at risk to fire loss, fuel hazard, and the approach to reduce fuel hazards in the FMUs. The level of fuel hazard is based on what is termed the fire regime condition class (FRCC). The FRCC includes three classes that measure the degree departure from the historical natural fire regime (Hann and Bunnell 2001). The departure from a natural fire regime is caused by changes to vegetation characteristics such as fuel composition, fire frequency and behavior, and other associated disturbances. The three FRCCs are low (FRCC 1), moderate (FRCC 2), and high (FRCC 3). The FRCC for an area is assigned based on current fuel conditions. FMUs that are classified as FRCC 1 are considered to be within the historic range of the fire regime variation for a vegetation type in central California; FMUs classified as FRCC 2 and FRCC 3 exhibit, respectively, moderate and considerable departure from the normal range of variation. Currently, the FMUs are classified as either FRCC 2 or FRCC 3.

Fires that occur in areas classified as FRCC 3 will usually burn more severely than fires in areas classified as FRCC I. In extreme cases, FRCC 3 fires can "sterilize" the soil by destroying the soil seed bank, soil organic matter, and soil microorganisms, and kill vegetation that otherwise may survive a less intense fire.

Table 3.17-3 Fire Management Unit Values at Risk and Fire Regime Condition Class Targets and Management Actions

FMU	Values At Risk	FRCC		Management Actions to Reach FRCC Proposed in CCMA RMP (Ch. 2)		
		Current	Target	Wildland Fire Use	Prescribed Fire Use	Non-fire Fuels Management
San Benito Natural Area	Unique forest assemblage, Special status species habitats, Watersheds	3/2	1	No	No	No
Clear Creek Serpentine ACEC	Special status species habitats, Watersheds, Cultural sites, Wildlife habitat	3	1	No	Yes	Yes
Hernandez Valley	WUI, Watersheds, Wildlife habitat, Grazing Riparian	3	1	No	Yes	Yes
San Joaquin Valley South	Special status species habitats, Watersheds, Cultural sites	3/2	1	No	Yes	Yes
San Joaquin South Continued	Camping sites, Cultural sites, Special status species habitats, Grazing, Wildlife habitat	3/2	1	No	Yes	Yes

The recovery of desirable vegetation in these situations will usually not occur without management intervention. Rehabilitating or returning FMUs classified as FRCC 2 or FRCC 3 to a lower classification may require proactive fuels management in the form of prescriptive vegetation treatments to reduce the buildup of hazardous fuels (Brown 2000). Prescribed fire, mechanical treatment (mowing, chopping, thinning), chemical treatments (herbicides), and biological treatments (livestock grazing, insects) are ways to improve the FRCC rating of an FMU by changing the nature of the fuel load and distribution to be within the range of natural variation, thereby reducing fire risk. Prescribed fires are carefully planned and purposely ignited to achieve specific management goals under very controlled conditions.

3.18 Lands and Realty

3.18.1 Introduction

The lands and realty program can be divided between land tenure adjustments and land use authorizations. Land tenure adjustments focus primarily on land acquisition and disposal, while land use authorizations consist of BLM approvals of rights-of-ways (ROWs), utility corridors and communication sites, and other leases or permits. Scattered tracts of public lands are present throughout the Planning Area, complicating BLM's ability to manage or control access or provide opportunity for enjoyment by the public. Opportunities exist to increase public benefits by disposing of some public lands through sale or exchange, or to acquire offered lands in areas that would enhance public enjoyment and facilitate resource management more efficiently. Acquired lands through previous land tenure adjustments are incorporated into this plan.

3.18.2 Regulatory Framework

3.18.2.1 Federal Regulations and Policies

In addition to being consistent with the goals and objectives for natural resources within the Planning Area, land tenure decisions must conform to the following regulations and policies:

- **Federal Land Policy and Management Act of 1976 (FLPMA)**– Lands are to be retained in Federal ownership, unless it is determined that disposal of a particular parcel will serve the national interest. Land use plans should avoid prescribing the method of disposal, acquisition, or property interest to be acquired.
- **FLPMA (Sales – Section 203, 43 USC 1713(a); Exchanges – Section 206, 43 USC 1716(a); and Reservation and Conveyance of Minerals – Section 209, 43 USC 1719(a)) or other statutes and regulations** – Lands or interest in lands that are available for disposal must be identified by parcel or by specific areas (on a map or by legal description).
- **Federal Land Transfer Facilitation Act (FLTFA) of 2000** – The FLTFA amended FLPMA to allow disposal in land use plans prior to July 25, 2000. The FLTFA currently does not apply to lands identified for disposal after July 25, 2000.
- **Recreation and Public Purposes Act (RPPA) of 1954, 43 U.S.C. § 869, et seq.1** – The RPPA, as amended, authorizes sale or lease of public lands for recreational or public purposes to State and local governments, and to qualified nonprofit organizations. RPPA leases must be for definitively proposed project with reasonable timetable and satisfactory plans for development, they must meet FLPMA disposal criteria, and no lands having "national significance" can be conveyed. Amount leased must be "reasonable" – no set amount total, but limits the amount per year by entity and should be no more than is "reasonably necessary" for the proposed use.
- **43 CFR 2740, 43 CFR 2912, 43 CFR 2911, and 43 CFR 2920 Land Use Authorizations** – Describes where and under what circumstances authorizations for use, occupancy, and development (such as major leases and land use permits) may be granted.
- **43 CFR 2806 – Corridor Designation.** Existing and potential ROW corridors (potential corridors include existing ROW routes with the potential for at least one additional facility and thus can be considered a corridor if not already designated) to minimize adverse environmental impacts and the proliferation of separate ROW.

3.18.2.2 County General Plans

The Planning Area includes 2 counties, each with their own County General Plan. In addition to these concerns, County General Plans define open space and conservation policy in the Planning Area and opportunities to coordinate with federal agencies like the BLM. The followings General Plans are currently in place: Fresno County, February 1995 and San Benito County, February 1995.

3.18.3 Regional Setting

The HFO administers approximately 63,000 acres of public land located in 2 counties. There are an additional 3,500 acres of private land with Federal ownership of the subsurface minerals, also known as "split-estate." Adjacent landowners include private holdings and the federal, state, county, or local governments. Consolidation of federal lands through exchange or disposal per FLPMA and as amended in the Federal Land Transaction Facilitation Act (FLTFA) would require consideration of suitability criteria, multiple-use values, and consistency with other HFO management objectives and plans.

3.18.4 Current Conditions and Trends

Since the release of the 1984 Hollister RMP, BLM has pursued an aggressive land exchange program to consolidate public lands in the Central Valley surrounding Clear Creek and Condon Peak. Most of these realty actions occurred as a result of land tenure decisions within the 1984 Hollister RMP. Land tenure adjustments have resulted in the disposal of approximately 2 acres for every acre acquired.

The trend in land exchanges have allowed for more efficient and better management of resource values on BLM lands with contiguous ownership. Acquisition of non-federal lands has improved public access, provided additional protection for threatened and endangered species habitat, reduced the potential for trespass, and improved the management and protection of cultural and rangeland resources. Land disposals have relieved BLM of the administrative burden of managing isolated parcels of federal lands. Long-term benefits include the reduction of encroachment onto public lands from the surrounding private property and increasing the local property tax rolls of additional private lands.

3.18.4.1 Lands for Retention

All lands not identified for disposal through this land use plan are identified for retention. They would be considered on a case-by-case basis for exchange or disposal per FLPMA. Lands identified for retention are considered as unsuitable for entry under any of the agricultural land laws because of significant multiple-use values.

3.18.4.2 Land Acquisition

Acquisition of lands in the past decade have been along the west side of the San Joaquin valley (Ciervo Hills – Joaquin Rocks) and were considered the highest priority action needed to implement a recovery strategy for the rare complex of San Joaquin endemic species in the northern sector of their range.

3.18.4.3 Land Disposal

Public lands transferred from BLM ownership are made subject to existing ROWs. ROWs closed through the disposal of public lands tend to be for small access roads rather than the larger utility ROWs. Lands that should be considered for disposal are scattered parcels that are difficult to manage, parcels that are continually threatened with encroachment or parcels without public access. No lands will be made available for disposal that will compromise the management objectives for the CCMA.

3.18.4.4 Land Use Authorizations

Rights of Way

Requests for ROW or construction of utility sites and related facilities outside of designated or established corridors are considered on a case-by-case basis (this would include additional costs for mitigation). Communication sites are authorized under FLPMA according to BLM's ROW policy. The CCMA has several mountaintops that are well suited for communication sites. There are presently seven communications sites located on or near San Benito Mountain, Santa Rita Peak, Spanish Lake, Sampson Peak and Sampson Creek Ridge. Existing utility corridors are located along Spanish Lake Road in the northeast portion of the CCMA.

3.18.4.5 Forecast

The BLM's lands and realty program for the Hollister Field Office includes a general acquisition and disposal plan, consistent with the goals and objectives for natural resources, that identifies a primary target area for future land acquisitions almost exclusively in western Fresno County. Many of the lands in this target area are adjacent to Clear Creek Management Area; and while the CCMA RMP identifies potential land tenure adjustments, future opportunities for acquisition or disposal of lands inside the CCMA boundary would be considered in light of the entire for the Hollister Field Office lands and realty program.

Land Tenure Adjustments

Although BLM may determine that disposal of a particular parcel will serve the national interest (FLPMA Section 102(a)(1)) through the land use planning, the CCMA RMP avoids prescribing the method of disposal, acquisition, or property interest to be acquired. Lands or interest in lands are available for disposal under a variety of disposal authorities, provided they meet the criteria outlined in FLPMA (Sales - Section 203, 43 U.S.C. 1713(a); Exchanges – Section 206, 43 U.S.C. 1716(a); and Reservation and Conveyance of Minerals, Section 209, 43 U.S.C. 1719(a)) or other statutes and regulations, are identified by parcel on Maps A – G in Appendix I.

None of the BLM-managed lands in CCMA are available for disposal under the Federal Land Transaction Facilitation Act of 2000 (FLTFA), because none of these public lands were identified as suitable for disposal in a land use plan prior to July 25, 2000. Conversely, all of the CCMA RMP amendments prior to 2000 proposed withdrawal of areas to be continued, modified, or revoked (including how the lands would be managed if the withdrawal were relinquished and an opening order issued) (see 43 CFR 2300). These proposed withdrawals were intended to be applied on BLM-administered lands in Clear Creek Canyon and the San Benito Mountain RNA to protect unique resource values. As a result, 995 acres of public lands are withdrawn from mineral entry in this portion of the Serpentine ACEC, as identified in the Federal Register, Volume 25, No. 142, published on July 23, 1970.

Land Classifications: Recreation and Public Purposes Act

Public comments received during the scoping period for the CCMA RMP suggested that BLM authorize sales or leasing of public lands in CCMA. With the exception of public lands in the Serpentine ACEC, BLM will evaluate suitability of public lands for disposal in the CCMA RMP. Pursuant to the BLM Land Use Planning Handbook, lands classification under the Recreation and Public Purposes Act are required for sales (see 43 CFR 2740) and leases (see 43 CFR 2912). To the extent that the land use planning procedures pursuant to 43 CFR 1600 differ from applicable classification procedures under 43 CFR 2400, the latter procedures shall be followed and applied.

The criteria that supports classification decisions is the same criteria utilized in the land use planning process to make decisions concerning the disposal or retention of public lands (FLPMA, Section 203). The process usually begins with an application by an entity desiring land (focuses on purpose to be served) for BLM-managed lands identified as suitable for lease or sale under the RPPA during the land use planning process. If lands are not identified as "suitable" for disposal in RMP, then a separate notice of realty action (and RMP Amendment) must be published and circulated prior to lease/sale.

A commitment by lessee(s) or conveyee(s) to a plan of physical development, management and use of the lands shall be required before a lease or conveyance is approved. To assure development of public lands in accordance with a development plan and compliance with an approved management plan, the authorized officer may require that public lands first be leased for a period of time prior to issuance of a patent, and funds from RPPA sales and leases usually go to the General Treasury.

Land Use Authorizations

Authorizations for use, occupancy, and development (such as major leases and land use permits) are currently granted (see 43 CFR 2740, 43 CFR 2912, 43 CFR 2911, and 43 CFR 2920, respectively) within existing and potential right-of-way corridors (potential corridors include existing right-of-way routes with the potential for at least one additional facility and thus can be considered a corridor if not already designated) to minimize adverse environmental impacts and the proliferation of separate right-of-ways (see 43 CFR 2806). However, the potential for development of areas in CCMA for renewable energy projects (e.g., wind and solar), additional communication sites, and other uses are limited, as wind and solar energy have low potential to produce significant economic activity. Nevertheless, western Fresno County is the area most likely to see interest in wind and solar energy development.

Currently, the Serpentine ACEC is not a right-of-way avoidance area (areas to be avoided but may be available for location of right-of-ways with special stipulations and areas which are not available for location of right-of-ways under any conditions). However, this type of restriction would be consistent with BLM's management objectives to minimize asbestos exposure and reduce asbestos emissions in the ACEC. Terms and conditions that may apply to right-of-way corridors or avoidance areas, including best management practices to minimize environmental impacts would be necessary to maintain resource values and protect public health and safety.